PB90-153727

Superfund Record of Decision (EPA Region 2)
Port Washington Landfill, Nassau County, NY
(First Remedial Action), September 1989

(U.S.) Environmental Protection Agency, Washington, DC

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United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R02-89/082
September 1989

EPA

Superfund Record of Decision:

Port Washington Landfill, NY

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16. Abstract (Limit: 200 words)

The Port Washington Landfill site is on the eastern portion of Manhasset Neck, Nassau County, Long Island, New York. The 139-acre municipally owned site consists of two landfilled areas separated by a vacant area. This Record of Decision addresses the 53-acre inactive landfill on the western portion of the site, which is the suspected source of methane gas thought to cause furnace explosions in residences neighboring the landfill during 1979 through 1981. From 1974 to 1983 the landfill operator accepted incinerator residue, residential and commercial refuse, and construction rubble for disposal. Because extensive air monitoring, performed in 1981, revealed high methane levels in several areas residences, a venting system was installed to prevent subsurface gases from migrating west of the landfill and to destroy hazardous chemicals commonly detected in sanitary landfill gas. In 1981 the county also determined the presence of VOC contaminants in a drinking water well onsite, which has since been removed from service. The primary contaminants of concern affecting the soil and ground water are VOCs including PCE, TCE, and benzene; and other organics including methane gas.

The selected remedial action for this site includes capping the landfill; rehabilitating the existing gas collection system and installing additional vacuum extraction vents; ground water pumping and treatment using a metals removal process and air stripping (See Attached Sheet)

17. Document Analysis a. Descriptors
Record of Decision - Port Washington Landfill, NY
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16. Abstract (Continued)

followed by discharge to an aquifer recharge basin; and environmental monitoring using ground water and landfill gas wells. The estimated present worth cost for this remedial action is $42,580,000, which includes a present worth O&M cost of $16,247,000 for 30 years.

DECLARATION FOR THE RECORD OF DECISION

Port Washington Landfill

SITE NAME AND LOCATION

Port Washington Landfill
Port Washington, Nassau County, New York

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Port Washington Landfill site (L-4), developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act and, to the extent applicable, the National Contingency Plan. This decision is based on the administrative record for this site. The attached index identifies the items that comprise the administrative record.

The State of New York concurs on the selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE REMEDY

The major components of the selected remedy include:

- Closure of L-4 in accordance with the 6 NYCRR Part 360 requirements for New York State sanitary landfills;
- Rehabilitation of the existing active gas venting system;
- Extension of the existing active gas venting system around the entire perimeter of L-4;
- Addition of a second gas combustion unit as standby;
- Placement of extraction wells in the Upper Glacial Aquifer in areas with elevated levels of groundwater contamination;
- Treatment of extracted groundwater from the Upper Glacial Aquifer through metals removal and air stripping prior to discharge to an aquifer recharge basin;
- Treatment of groundwater at the Southport Well through air stripping should the Port Washington Water District decide to use the Southport Well as potable water;

- Installation of groundwater monitoring wells to further define the extent of the L-4 leachate and VOC plumes, as well as to refine the placement of the proposed extraction wells;
- Installation of additional groundwater and landfill gas wells around L-4 to be used in conjunction with the existing landfill gas and groundwater monitoring network in order to comprehensively monitor L-4;
- Development and conduct of a comprehensive monitoring plan for L-4, including performance monitoring of the gas venting system; and
- Development and conduct of an operation and maintenance plan which will govern those remedial actions selected in this ROD as well as those presently employed for L-4.

DECLARATION

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. However, because treatment of the principal threats of the site was not found to be practicable, this remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. The size of the landfill and the fact that there are no on-site hot spots that represent the major sources of contamination preclude a remedy in which contaminants could be excavated and treated effectively.

Because this remedy will result in hazardous substances remaining on-site above health-based levels, a review will be conducted no later than five years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

William J Muszynski

William J. Muszynski, P.E.
Acting Regional Administrator

9/30/89
Date

SITE NAME, LOCATION, AND DESCRIPTION

The Port Washington Landfill is located in the northwestern portion of Nassau County, in Long Island, New York (figure 1). It is situated on the eastern portion of Manhasset Neck, approximately 5 miles east of the New York City line. The entrance to the Landfill property is on West Shore Road. The landfill is located on a 139 acre lot (figure 2), owned and operated by the Town of North Hempstead (hereinafter "the Town"). This property contains two landfilled areas separated by a vacant area. The L-4 parcel, which has been the subject of EPA's Superfund investigation, is a 53 acre inactive landfill on the western portion of the property, while the L-5 parcel is an active sanitary landfill on the eastern portion of the property.

The current land surface elevation at the L-4 landfill ranges from approximately 50 feet above mean sea level (MSL) at its eastern border to approximately 160 feet above MSL at the western border. The topography west of the landfill varies from 150 to 200 feet above MSL.

Geological strata underlying the site are composed of unconsolidated glacial gravel, sand, silt, and clay of Pleistocene age (figures 3 and 4). Sediments below the Pleistocene glacial deposits in the southern portion of Manhasset Neck consist of marine and continental Cretaceous age clay, silt and sand of the Magothy Formation. Underlying this is the Raritan Formation. The Raritan is locally composed of two units, an upper clay member and the lower Lloyd sand. The Raritan Formation is underlain by lower Paleozoic and/or Precambrian metamorphic bedrock. In the northern portion of Manhasset Neck are the Port Washington Confining Unit and the Port Washington Aquifer. This aquifer is underlain by bedrock.

The regional hydrogeology of Manhasset Neck is centered around alternating layers of aquifers. Beneath the L-4 site, the Upper Glacial Aquifer is the uppermost water bearing zone. The Magothy Aquifer immediately underlies the Upper Glacial Aquifer, with the Lloyd Aquifer separated from the Magothy by the Raritan Clay formation. All of these aquifers are used locally for public water supply. The Upper Glacial Aquifer generally flows from west to east in the general area of the landfill as it carries water from the crown of Manhasset Neck to Hempstead Harbor. Underneath L-4, this flow regime takes on a localized northern bend before discharging to the Harbor. The Magothy Aquifer, which has similar flow characteristics, also discharges into Hempstead Harbor. The Lloyd Aquifer is insulated from the Harbor by the Raritan Clay so that waters contained in this unit can migrate beneath Hempstead Harbor.

Area potable water wells include the Southport well (Magothy Aquifer), located 1300 feet west and hydraulically upgradient fromthe L-4 part of the landfill; the Stonytown well (Lloyd Aquifer), located 3000 feet southwest and hydraulically upgradient from L-4; the Hewlett well (Magothy Aquifer), located 3000 feet south and hydraulically upgradient of L-4; and the two Bar Beach wells (Upper Glacial Aquifer), located 4000 feet north and possibly hydraulically downgradient of L-4 (figure 5).

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Prior to the Town's purchase of the landfill property in 1973, the site area was used as a sand and gravel mining operation that began in the 1880's. After the mining operation had terminated, and prior to development by the Town, the area was used by the All-American Sand and Gravel Corporation as a landfill for construction debris, such as concrete, wood, and miscellaneous solid wastes.

The initial design of the landfill (L-4) called for placement of a 20 mil polyvinyl chloride (PVC) liner between the refuse and the native soil. Landfilling at L-4 began in March, 1974 with the disposal of incinerator residue, residential and commercial refuse, and construction rubble. As landfilling progressed, a layer of clay was placed between refuse deposited along the western edge of the landfill and the existing steep gradient of native soil. A leachate control system was added in March, 1976. In June, 1977, the Nassau County Department of Health (NCDH) tested groundwater monitoring wells at the landfill. The analysis indicated the presence of organic and inorganic contaminants.

During the winters of 1979, 1980 and 1981, furnace explosions occurred in homes to the immediate west of the landfill. In 1981, extensive air monitoring was performed in the area by the Nassau County Fire Commission. This monitoring demonstrated excessive methane levels in several area residences. As a result, remedial measures were initiated by the Town to prevent the uncontrolled migration of subsurface gases to the west of the landfill, utilizing a system which employs both active and passive venting of landfill gases (figure 6). This system was designed to collect actively vented gases and to flare them in a horizontal combustion unit (HCU) in order to destroy the hazardous chemicals commonly detected in sanitary landfill gas.

Also, in 1981, the NCDH tested for and discovered volatile organic contaminants, primarily chlorinated hydrocarbons, in the Southport well. This well had previously been a source of drinking water in the Port Washington Water District. As a result of the NCDH findings, the well was eventually removed from service as a potable water supply.

In September, 1983, the site was given final status on EPA's National Priorities List (NPL) primarily because of the contamination of the Southport well.

The Town stopped accepting waste at L-4 in 1983. Since then, the Town has continued to monitor the landfill's immediate environment, especially to the west of L-4, for both methane and hazardous chemicals.

As a result of the site's placement on the NPL, the New York State Department of Environmental Conservation (DEC) assumed the lead agency role in enforcement negotiations with the Town, which was the only potentially responsible party identified at that time. In February, 1984, the DEC requested that EPA assume the lead role in enforcement negotiations with the Town. These negotiations eventually led to EPA's development of a workplan in October, 1985, to conduct a remedial investigation (RI) and feasibility study (FS) at L-4. EPA then issued notice of potential liability to the Town, and indicated that as a potentially responsible party (PRP) the Town could either conduct the work which was described in the workplan or EPA would do so using funding provided through the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). In December, 1985, the Town indicated to EPA that it had elected not to perform the specified work, although it still wished to remain active during the RI/FS process.

EPA's field investigation was initiated in December, 1986 (after the delayed passage of the Superfund Amendments and Reauthorization Act (SARA)) and included: the installation of 11 groundwater monitoring wells (figure 7), 4 landfill gas monitoring wells (figure 8), 5 landfill gas pressure monitoring wells; and deployment of an on-site meteorological station. These actions were intended to complement the existing network of water and gas monitoring wells which had previously been installed by the Town as part of the local effort to monitor L-4. EPA then commenced a one year monitoring program of the landfill in which this network of wells was sampled on several occasions. The surface of L-4 was also tested with special equipment in order to estimate the amount of landfill gas being emitted from the surface of the fill (figure 9). The resulting data collected during this investigation can be found in the remedial investigation report prepared by EPA for this site.

EPA recently conducted a PRP search, and is in the process of sending letters notifying several other PRP's of their potential liability under CERCLA, including some who apparently generated or transported hazardous wastes/substances to L-4.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

Public involvement and interest in this site has been significant for the duration of the RI and FS. Some of the factors which account for this are the proximity of the site to a large residential area; the multiple exposure pathways by which contaminants could theoretically migrate off-site; the ongoing activities at the active portion (L-5) of the municipal landfill; and the involvement of a well organized Citizens' Advisory Committee (CAC), more formally known as the "Parties in Interest", which already existed at the time EPA commenced preparation of a draft workplan for this project.

The Town and the CAC were meeting on a regular basis on solid waste issues when EPA began preparation of the draft workplan. EPA developed a Community Relations Plan which adopted and expanded this forum to include the discussion of issues pertinent to the RI and FS being conducted at L-4, such as the release and migration of hazardous substances from L-4. During EPA's performance of the RI and FS, numerous meetings were held pursuant to this plan to solicit suggestions, encourage information exchange, and review project status with the Town and the CAC.

In addition to the Town/CAC meetings, personal interviews were conducted by EPA contractors to ascertain relevant issues and concerns among the interested public; and several workshops were sponsored by EPA during the RI and FS for the purpose of demonstrating well drilling technology, the methodology of health risk assessment, and the techniques of groundwater and subsurface gas modelling.

After completion of the RI and FS, EPA prepared a proposed plan which was based on the information and analysis contained in the RI/FS. EPA also formally announced the start of a one month public comment period on the report and proposed plan commencing on July 21, 1989. At that time, EPA ensured placement of copies of the RI and FS and the proposed plan in two information repositories, i.e., Town Hall of North Hempstead, and the Port Washington Public Library. Individual copies of the RI/FS and proposed plan were also sent to CAC members that have demonstrated a significant interest in the project, as well as to the Town and relevant public agencies. Copies of the proposed plan were also distributed to the entire mailing list of various parties who have at some time expressed an interest in this project.

A public meeting was held by EPA on August 9, 1989 to formally present the findings of the RI and FS and the details of the proposed plan. Questions and comments were also formally recorded so that they could be addressed in a responsiveness summary which is incorporated herein as Appendix 5. EPA honored requests to extend the comment period by 30 days through September 20, 1989 because of the large volume of information contained in the RI and FS reports.

The administrative record for this site has been assembled and is presently available for review at the Port Washington Public Library. It will also be available at the Town Hall of North Hempstead. The decision for this site is based on the information contained in the administrative record.

SCOPE AND ROLE OF OPERABLE UNIT

Due to the interrelated nature of the landfill gas and groundwater contamination at this site, the proposed plan addresses a comprehensive approach, i.e. one operable unit, to remedial action at the site. In other words, this project has not been segmented into smaller "operable units" or incremental portions. EPA believed that although segmenting the project into several operable units might possibly accelerate certain aspects of the remedial effort, the possible relationship of landfill gas migration to groundwater contamination suggested that one operable unit was more likely to produce a remedial plan whose elements would be consistent with each other. Based on the results of future groundwater monitoring, particularly to the north of the site, a second operable unit RI and FS may be required to further address groundwater contaminant migration in this area.

SUMMARY OF SITE CHARACTERISTICS

As a result of EPA's extensive RI at this site, the extent and nature of contamination has been characterized in sufficient detail to conduct a study of feasible remedial alternatives. The following is a summary of this characterization.

Vapor phase volatile organics have been measured predominantly in the low parts per billion (ppb), with a range of 1 to 692 ppb in the unsaturated zone underneath both the North Hempstead Country Club's golf course and area residences as far as 1,000 feet west of L-4 (tables 3-20, 3-21, and 3-22 of the RI report). The most prevalent compounds measured were trichloroethylene, 1,1,1-trichloroethane, 1,1-dichloroethane, tetrachloroethylene, chloroform, 1,1-dichloroethylene, vinyl chloride, benzene, and carbon tetrachloride. It is hypothesized that these soil vapors resulted from subsurface landfill gas migrations from L-4 to the west (figure 3-7 of the RI report). In addition, high concentrations of subsurface methane have been detected beyond part of the southern boundary of the landfill in the unsaturated zone beneath the Seaview Industrial Park. Significant concentrations of subsurface methane have been detected on occasion at the western landfill boundary; moreover, this condition appears to coincide with the periodic shut down of the existing active venting system. EPA believes that all of these measured methane migrations originate from L-4. It is currently unknown whether methane or volatile organic compounds are migrating to areas not monitored by subsurface gas wells to the north and east of L-4.

Vapor phase volatile organics emissions from the surface of L-4, including open vents, were also measured (tables 3-13, 3-14, and 3-15 of the RI report). Compounds which were detected relatively consistently were benzene, vinyl chloride, tetrachloroethylene, and trans 1,2-dichloroethylene. The surface emissions from L-4 cover material were generally in the range of 1-50 ppb, while other areas that might be described as gas conduits i.e., landfill cracks, open vents, etc. were generally in the 100-1000 ppb range. One location at a landfill fissure registered several of these compounds in the low parts per million range during the second sampling event. Offsite ambient air measurements performed for seven target compounds during the remedial investigation resulted in a few low concentration readings, which EPA believes to have resulted from motor vehicle emissions.

Volatile organic groundwater contamination has been measured generally in the range of 1 to 100 ppb in the Upper Glacial Aquifer immediately west of L-4 (table 5-10 of the RI report). This contamination is particularly concentrated in Town monitoring wells 6, 9, and 10. The area of contamination is within the zone of contribution to the Southport well (figure 5-14 of the RI report). The most prevalent compounds include trichloroethylene, tetrachloroethylene, 1,1,1-trichloroethane, 1,2-dichloroethane, 1,1-dichloroethylene, vinyl chloride and chloroform. The full extent of this volatile organic contamination is not presently known because of a lack of monitoring wells to the north of L-4. The remedial investigation has concluded that the naturally existing gradient in the Upper Glacial Aquifer in the vicinity of L-4 would carry contaminants in that direction, as well as downward through the aquifer.

Elevated concentrations of ammonia and Kjeldahl nitrogen were detected in a well northeast of L-4, indicating the presence of leachate in the groundwater at that location. Although the leachate does not appear to be contributing volatile organic contamination to the groundwater northeast or east of L-4, the conventional inorganic compounds released from L-4 will degrade the quality of the groundwater. The full extent of the inorganic leachate contamination is not known, since there are no monitoring wells within its flowfield to the north.

There were also several isolated instances of hazardous inorganics, such as lead and chromium in slight excess of maximum contaminant levels in the L-4 area; however, these results have not been identified with any particular source and do not appear to indicate any pattern of gross heavy metals contamination.

There are existing and potential human exposure pathways for the contamination that have been documented during the remedial investigation for this site. These pathways can theoretically result in human exposure either through ingestion, inhalation, or dermal contact, and therefore the discussion of exposure pathways will be generally organized within these categories of exposure.

There may also be environmental exposure pathways at this site. The only potentially significant environmental receptor that has been identified in the area is the flora and fauna of Hempstead Harbor.

The exposure of human receptors via ingestion can occur through drinking water from the Southport well and incidental ingestion of soils. Ingestion of well water is only a risk under a future use scenario at the present time, since the well has been out of service on a permanent basis as a potable water supply since 1981. This risk has been calculated within the scenario of returning the well to service without any additional remedial action being taken at the site. The incidental ingestion of contaminated soil from the landfill is also considered under a future use scenario. Currently, the Landfill has adequate security to prevent those most likely to ingest soil i.e., young children, from frequenting the property. This risk has been calculated within the scenario of future residents living on the L-4 cell.

The exposure of human receptors via inhalation can occur through the inhalation of contaminants that become airborne from various landfill sources, that migrate as constituents of landfill gas in the unsaturated zone underground and eventually surface inside enclosed structures, or that volatilize during the use of contaminated potable water, particularly hot showers. The first two of these exposure pathways are considered to be presently in existence, while the shower inhalation pathway is dependent on the theoretical return of the Southport well to service without further remedial action. The various landfill sources that were evaluated for airborne contamination were the surface of L-4, open passive vents, the leachate pond, the HCU (with flare), and the gravel filled trench which lies along the western boundary of L-4.

The exposure of human receptors can occur through dermal contact with contaminated soils on L-4. This exposure pathway was not evaluated for workers at L-4, since the levels of chemicals of concern detected in the L-4 surface soil were extremely minute. However, this pathway was evaluated within the theoretical scenario of future residents living on L-4, since this scenario presents a greater probability of frequent dermal exposure.

The exposure of environmental receptors in Hempstead Harbor can occur through migration of contaminated groundwater into the Harbor. However, both EPA and the natural resource trustee for Hempstead Harbor i.e., the National Oceanic and Atmospheric Administration, believe that the data collected during the remedial investigation is insufficient to determine the possible impacts or potential risks to Harbor flora and fauna. This insufficiency of data again derives from the lack of groundwater monitoring wells to the north of the site. There are presently no habitats of federally endangered species designated in the project study area.

Many of the chemicals of concern at this site are suspected human carcinogens, based on animal studies. However, there are only two compounds i.e., vinyl chloride and benzene, which are classified as definite human carcinogens based on sufficient evidence from human epidemiological studies. A complete list of the chemicals of concern for the L-4 site is contained in table 1.

SUMMARY OF SITE RISKS

Cancer potency factors (CPFs) have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of $(mg/kg\text{-}day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the CPF. Use of this approach makes the underestimation of the actual cancer risk highly unlikely. Cancer potency factors are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied.

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health risks from exposure to chemicals exhibiting non-carcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help insure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur.

Risk characterization for the Port Washington Landfill site included an assessment of risk associated with exposures to both noncarcinogens and carcinogens.

Noncarcinogenic risks were assessed using a hazard index (HI) computed from expected daily intake levels (subchronic and chronic) and RfDs (representing acceptable intakes). Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ). This is the ratio of the estimated intake (derived from the contaminant concentration in a given medium) to the contaminant's RfD. By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the HI can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

Potential carcinogenic risks were computed by multiplying chronic (long-term) intake levels to a respective carcinogenic potency factor. Excess lifetime cancer risks are probabilities that are generally expressed in scientific notation (e.g., $1x10^{-6}$). An excess lifetime cancer risk of $1x10^{-6}$ indicates that, as a plausible upper bound, an individual has a one in one million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site.

The context within which to judge the relative risk from each of the pathways has been established by EPA. For carcinogens, the target risk range is $1x10^{-4}$ to $1x10^{-7}$ excess lifetime cancer risk. For noncarcinogens, where the sum of expected dose/RfD ratios exceeds one, observed concentrations pose unacceptable risks of exposure.

The following is a summary of significant site risks based on the endangerment assessment conducted as part of the Port Washington Landfill remedial investigation. For a complete summary of all risks calculated for this site, please see chapter 7 (Endangerment Assessment) of the RI report.

*Excess lifetime cancer risks associated with potential ingestion of groundwater from the Southport well were estimated to exceed 10^{-6} (one occurrence in one million chances) for both the average and plausible maximum exposure scenarios ($2x10^{-6}$ and $9x10^{-5}$, respectively). This assumes, however, that this well is reopened for use and groundwater from the well is not combined with other wells prior to distribution. The risks were predominantly due to ingestion of vinyl chloride, 1,1-dichloroethane, 1,1-dichloroethylene, and tetrachloroethylene.

*Excess lifetime cancer risks from the potential inhalation of volatile organics posed by showering with groundwater from the Southport well exceed 10^{-6} for the plausible maximum case ($2x10^{-5}$). The risks were predominantly due to inhalation of 1,1-dichloroethylene and vinyl chloride released from shower water. The same caveats mentioned above are applicable to this exposure pathway (e.g., assuming the well would be reopened).

*Under hypothetical future use conditions, excess lifetime cancer risks due to ingestion of groundwater in the landfill site area exceed 10^{-6} for both the average and plausible maximum cases ($7x10^{-5}$ and $3x10^{-3}$, respectively). This assumes, however, that a new well is installed in the immediate landfill area and that currently observed levels of contamination remain unchanged well into the future. The average case risk is primarily due to ingestion of arsenic, 1,1-dichloroethane, 1,1-dichloroethylene, and vinyl chloride. The maximum case risk is primarily due to ingestion of arsenic, benzene, 4,4'DDT, 1,1-dichloroethane, 1,1-dichloroethylene, 1,3-dichloropropane, tetrachloroethylene, trichloroethylene, and vinyl chloride.

*Excess lifetime cancer risks associated with inhalation of volatile organics by residents in the sub-division immediately west of L-4 exceed 10^{-6} for the plausible maximum case ($5x10^{-6}$). Exposures to volatile organics emitted from four separate sources combined were evaluated for this pathway (HCU, leachate pond, surface of L-4, and soil gas infiltration). The maximum case risks are primarily due to inhalation of 1,1-dichloroethylene present in infiltrating soil gas. There are many uncertainties, however, associated with this risk estimate. For example, the emission source primarily accounting for the estimated risk was soil gas infiltration into the home. A complex emission and indoor air model was used to predict air concentrations in the home. There are uncertainties in both the models as well as in the parameters used in them. In general, since conservative assumptions were used to compensate for these uncertainties, the risks are considered to be upper bound estimates.

*Under hypothetical future use for a residence at the L-4 landfill, lifetime excess cancer risks due to inhalation of volatile organics slightly exceeded 10^{-6} for the plausible maximum case only ($2x10^{-6}$). Three emission sources were evaluated for this pathway (HCU, leachate pond, and surface of L-4). The risk is primarily due to inhalation of 1,1-dichloroethylene and vinyl chloride emitted from the HCU and the surface of L-4. This scenario conservatively assumes that a residence will be built on L-4, although this is unlikely to occur. In addition, there are many uncertainties associated with the emission and air dispersion models used to predict air exposure point concentrations.

DESCRIPTION OF ALTERNATIVES

The FS alternatives developed for this project were intended to control the source and manage the migration of contaminants associated with the L-4 section of the Port Washington Landfill. A "no action" alternative was also evaluated as required by regulation, in order to provide an appropriate alternative in the event that no contravention of standards nor significant health or environmental risks were found to exist at the site.

Because of the size of the L-4 section and the ubiquitous distribution of low levels of contaminants throughout the fill material, alternatives for source control involving excavation and/or treatment of the fill material were not considered technically feasible and were dropped from further consideration. Instead, EPA developed and evaluated several "containment" alternatives for source control. Specifically, these alternatives are strategies designed to reduce the off-site migration of contaminants in both landfill gas and landfill leachate through the use of containment technology.

EPA also developed and evaluated several alternatives to address the management of contaminants which have already migrated away from the L-4 section. These alternatives are strategies which only address the migration of contaminated groundwater, since the calculated health risks associated with the present off-site levels of subsurface gas to the west of L-4 are within EPA's range of acceptable risk.

Landfill gas migration to the south of L-4 (and possibly to the north and east) is uncontrolled at the present time; however, EPA believes that implementation of appropriate source controls as described in the preferred alternative will effectively and rapidly remedy this migration of landfill gas.

The preferred alternative will combine what EPA believes is the most appropriate source control alternative with the most appropriate management of migration alternative.

The alternatives presented below are those which were evaluated in detail following the preliminary screening of alternatives. They have been indexed to correspond with the descriptions of alternatives contained in the FS report.

No Action

In this alternative, no further source controls or management of contaminant migration would be implemented beyond that which is presently occurring. The Southport well, if returned to service, would be expected within a short period of time to produce water which contravenes applicable drinking water standards; therefore, the well could not be returned to service as a reliable supply of potable water under this alternative. The Town's gas and leachate collection systems would continue to operate in their present mode and condition, and existing monitoring programs would continue as presently implemented.

Source Control (table 2)

G-2

In this alternative, the L-4 section would be closed in accordance with 6 NYCRR Part 360. The main feature of landfill closure is the placement of a highly impermeable cap over the landfill to reduce the infiltration of water into the fill. In addition, the existing gas collection system would be rehabilitated in order to return it to its design capability and hence improve its operation and reliability. This rehabilitation would include the rebuilding of the main gas header in the active venting system, with elimination of existing low points in the header where condensate presently collects and partially impedes gas flow in the system.

G-3

In this alternative, the L-4 section would be closed in accordance with 6 NYCRR Part 360. The Town's existing gas collection system would be rehabilitated, and additional active (vacuum extraction) vents would be installed around the perimeter of L-4. These additional vents would be placed outside the fill material and would be manifolded with an additional length of gas collection header. This header would in turn be tied into the existing blower station which is estimated to have sufficient capacity to create the required pressure changes in the expanded system. A new HCU would also be added as a standby unit.

G-4

In this alternative, the L-4 section would be closed in accordance with 6 NYCRR Part 360. The Town's existing gas collection system would be rehabilitated, and additional active vents would be installed in perimeter areas of L-4, as detailed in G-3 above. Moreover, additional active vents would be created throughout the interior of the L-4 section through new vent installations and conversion of existing "cistern" vents to the active mode, and the existing leachate underdrain system would be modified to also collect landfill gas. The vent risers installed as part of the landfill cap would also be connected to the gas collection system. A second HCU would also be added to handle the increased gas collection in this alternative.

Management of Migration (table 3)

W-2

In this alternative, water from the Southport well would be returned to distribution as potable water using air stripping technology to remove volatile organic contaminants. The need for treatment of air emissions from the air stripper would be evaluated during the design phase. In addition, a comprehensive program of landfill gas and groundwater monitoring would be implemented in order to effectively monitor offsite migration of hazardous chemicals, as well as to fully characterize the groundwater quality and hydrology in the area to the north of L-4.

W-3

In this alternative, which would also include the comprehensive program of environmental monitoring, the Southport well would be returned to distribution as a potable water supply with air stripping technology to remove VOCs (with possible treatment of air emissions, if required), and additional extraction wells would be installed in the area of elevated organic contamination (to the immediate northwest of L-4). The extracted groundwater would require air stripping to remove VOCs, and possibly an additional treatment step for metals removal, depending on the method of discharge (and the associated regulatory requirements) for the extracted and treated effluent. The treated effluent would be discharged either: a) to a recharge basin in the vicinity of the landfill; or b) to Hempstead Harbor.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

This section provides a glossary of the nine criteria and an analysis, with respect to these criteria, of all of the alternatives under consideration for remediation of the L-4 section of the Port Washington Landfill.

Glossary of Evaluation Criteria

o Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks are eliminated, reduced or controlled through treatment, engineering controls, or institutional controls. A comprehensive risk analysis is included in the Endangerment Assessment, which is detailed in chapter 7 of the RI report.

o Compliance with ARARs addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements (ARARs) and/or provide grounds for invoking a waiver. A complete listing of ARARs for this site can be found in section 2 of the FS.

o Short-term effectiveness involves the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period of the alternative.

o Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

o Reduction of toxicity, mobility, and volume refers to the anticipated performance of the treatment technologies, with respect to these parameters, a remedy may employ.

o Implementability involves the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement the chosen solution.

o Cost includes both capital and operation and maintenance (O&M) costs. Cost comparisons are made on the basis of present worth values. Present worth values are equivalent to the amount of money which must be invested to implement a certain alternative at the start of construction to provide for both construction costs and O & M costs over a 30 year period.

o State acceptance indicates whether, based on its review of the RI/FS and proposed plan, the State concurs with, opposes, or has no comment on the preferred alternative.

o Community acceptance is assessed in the ROD following a review of the public comments received on the RI/FS report and on the proposed plan.

* * * * *

The following is an analysis with respect to the above criteria of the various alternatives retained by EPA for further analysis after preliminary screening. Please note that source control and management of migration alternatives are evaluated separately, since it is EPA's intent to select one alternative from each of these categories. Also, since all of the source control alternatives include landfill closure as part of the alternative, closure was not included in the comparative analyses of the various source control alternatives.

Overall Protection of Human Health and the Environment

Under the no action alternative, there would be no control or reduction of contaminants originating from L-4. Subsurface gas migration would only be controlled in one direction i.e., the west, utilizing the existing system. Moreover, the control of gas migration in that direction would be inconsistent, due to the need for system rehabilitation and continuous operation. Explosive levels of subsurface gas would at times be exceeded in offsite areas not protected by gas containment technology. The Southport well would not be able to return to service as a potable water supply without contravening both State and Federal drinking water standards in a short time. The Upper Glacial Aquifer would continue to degrade locally in the vicinity of L-4, and the risks to other receptors to the north and northeast, i.e., Hempstead Harbor, Bar Beach wells etc. would remain unquantified.

Source Control

Alternative G-2 would not be protective of human health and the environment, since it is not expected that the existing venting system, even when operating at peak capacity, could effectively prevent gas from migrating underground to the south. Alternatives G-3 and G-4 are expected to be protective of human health and the environment. Because each of these alternatives includes ringing L-4 with a series of gas vents, lateral subsurface gas migration into offsite areas should be minimal or non-existent. G-4 would be more protective in the long term than G-3 given its redundancy and enhanced ability to remove landfill gases from the interior of L-4.

Management of Migration

Alternative W-2 would allow the Southport well to return to service as a potable water supply with the incidental benefit of partial aquifer remediation. However, this alternative would also tend to "smear" the area of elevated VOC concentration between the well and L-4, and could result in contaminant loadings at Southport which might tax the air stripper's removal efficiency. W-3 is more protective of both human health and the environment, since it would minimize the probability of the smear effect from occurring by creating a hydraulic sink through the use of extraction wells in the area of elevated contamination. The Southport air stripper under this alternative could be downsized from that of W-2 because of this advantage. Removal of additional contamination in the aquifer should also have an as yet unquantified protective effect on hydraulically downgradient potential receptors, i.e., Bar Beach wells, Hempstead Harbor, etc.

Compliance with Applicable or Relevant and Appropriate Requirements

Under the no action alternative, none of the ARARs discussed below for either source control or management of migration would be met over the short term, since no additional actions would be taken. Natural attenuation of contaminants in the ground water could result in compliance with ARARs for this media over the long term.

Source Control

All of the alternatives which involve closure will eventually meet the requirements (ARARs) for the 6 NYCRR Part 360 regulations. A significant requirement of these regulations is the ability of the alternative to fulfill requirements of 6 NYCRR Part 360 which pertain to explosive levels of landfill gas. Alternatives G-3 and G-4, are designed to meet these requirements for methane immediately upon implementation. G-3 and G-4 offer the most comprehensive protection since they include provisions to intercept all possible avenues of potential off-site gas migration; and should be most reliable in meeting Part 360 requirements pertaining to explosive gases.

Management of Migration

Both W-2 and W-3 will meet ARARs for potable water distribution (Safe Drinking Water Act Maximum Contaminant Levels (40 CFR 141) and New York State Department of Health Sanitary Code-Drinking Water Supplies (10 NYCRR Subpart 5-1)) at the Southport well immediately upon their implementation. However, W-3 will meet aquifer ARARs more quickly and over a larger area than W-2 because of the strategic placement of additional groundwater extraction wells.

Air stripper air emissions in W-2 and W-3 will meet ARARs including 6 NYCRR Parts 201, 202, 211, and 231.

The NYSDEC policy of returning extracted groundwater (alternative W-3) to the aquifer of origin is to be considered in the determination of the discharge location for W-3's extraction wells. The recharge basin scenario would meet this policy.

Short-term Effectiveness

Although there are no short-term construction risks associated with the no action alternative, there are also no short-term benefits to be derived from it.

Source Control

The short-term impacts due to construction increase from G-2 through G-4, since the amount and complexity of construction also increases in the same order. However, utilization of appropriate techniques can greatly mitigate most of the short-term impacts, including the potential for system downtime during replacement of the vent system header. Each of the source control alternatives will be immediately effective once implemented. G-4 will take the longest to design and construct (3-4 years), while G-2 and G-3 will take approximately 2-3 years to design and construct.

Management of Migration

Both W-2 and W-3 are equally effective in the short term in returning the Southport well to service as a potable water supply.

Long-term Effectiveness

The long-term effectiveness of no action would be similar to many of the other alternatives if the effects are evaluated in the distant future. The L-4 cell will gradually cease gas and leachate production; the groundwater contaminant loading will gradually cease; the existing contaminated groundwater will eventually make its way to Hempstead Harbor; and any offsite gas migration will also gradually cease. However, EPA believes that, if no action was chosen, these developments would not occur to an acceptable degree for many years.

Source Control

Alternative G-2 would not provide any long-term protection from subsurface gas migration along the southern or northern perimeter of L-4. G-3 and G-4 would effectively prevent subsurface offsite gas migration in the long term, but G-4 would perform this function more reliably in the long term because of its expected ability to consistently maintain combustion in the HCU. When the flare cannot be maintained, the vacuum on the collection system has to be temporarily eliminated or reduced in order to allow the BTU content in the collected gas to build up again. The use of supplemental fuel under G-3 to maintain the flare, however, would make both G-3 and G-4 equally reliable in theory.

Management of Migration

Alternative W-3 is more effective in long-term aquifer remediation than is W-2. This advantage is particularly noteworthy since the landfill study area is part of the EPA-designated Long Island sole source aquifer.

Both alternatives will allow for the return of the Southport well as a long-term source of potable water.

Reduction of Toxicity, Mobility, and Volume

There are some reductions of toxicity, mobility, and volume currently taking place. The HCU is periodically reducing the toxicity of the collected landfill gas. Also, the mobility of subsurface gas moving offsite has been reduced by the existing venting system.

Source Control

Alternatives G-3 and G-4 would equally reduce the mobility of subsurface landfill gas migration offsite. G-4 would reduce the greatest amount of toxicity through destruction of collected gases in two HCUs, followed by G-3, and then G-2, which would have the smallest gas flow to the HCU and consequently reduce toxicity the least.

Management of Migration

The W-3 remedy is intended to capture and treat contaminated groundwater, as well as return the Southport Well to service, whereas W-2 was only intended to return the Southport Well to service. Therefore, W-3 would reduce the amount of toxicity, mobility and volume of contaminants in the Upper Glacial Aquifer well in excess of the incidental amounts achieved through the implementation of W-2 (removal of contaminants at Southport well only).

Implementability

The no action alternative is easily implemented from a technical and institutional perspective.

Source Control

All of the source control alternatives are implementable from a technical perspective. Institutional issues relating to access and operation of some of the proposed facilities will be examined more closely during design. At the present time, EPA believes that all of the source control alternatives will be institutionally implementable.

Management of Migration

All of the management of migration alternatives are implementable from a technical perspective. Institutional constraints relating to access will be examined more closely during design.

The Port Washington Water District has indicated to EPA its belief that it is premature at present to contemplate the return to service of the Southport Well. The Water District's belief would suggest that alternative W-2 is not readily implementable from an institutional perspective, while alternative W-3 is likewise partially constrained (extraction wells are not envisioned to be operated by the Water District, and therefore should still be institutionally implementable).

Cost

Summary of Present Worth Costs:

No Action- $544,000

Source Control:

G-2-	$5,496,000
G-3-	$7,461,000
G-4-	$11,754,000
Closure	$17,940,000[+]

Management of Migration:

W-2-	$7,185,000
W-3-	$10,141,000- $15,429,000[*]

[+] All of the source control alternatives include landfill closure as an integral part of the source control. For costing purposes, the closure cost estimate includes capping the site with clay after an adjustment to the existing grade, which represents the highest cost capping option. In addition, the 30 year present worth cost to operate and maintain the leachate control system, presently utilized to handle the leachate from L-4, is estimated to be $1,735,000 and should be added to the present worth cost of each source control alternative.

[*] range of present worth costs reflect the options of discharging treated water from the extraction well system to Hempstead Harbor or to groundwater recharge basins.

For a detailed breakdown of project costs, please see table 4 (source control alternatives) and table 5 (management of migration alternatives).

State Acceptance

The State of New York concurs with the selected remedy (see State letter of concurrence-Appendix 4).

Community Acceptance

EPA believes that the selected remedy has the support of the affected community, particularly since it has incorporated modifications to the proposed plan to address (where feasible from a technical and a program perspective) the concerns of most importance to that community.

SELECTED REMEDY

The selected remedy for this site is a combination of source control alternative G-3 and management of migration alternative W-3.

Many of the technical details associated with the selected remedy will be formulated during the design stage. However, to provide a basis for a better understanding of the selected remedy, some preliminary design information has been incorporated into the description of the selected remedy. It should be further noted that any preliminary design information represents general approximations of selected remedy parameters, and therefore could undergo modification during the actual design phase of this project.

The following is a detailed description of the selected remedy.

L-4 will be closed in accordance with 6 NYCRR Part 360. Closure is intended to control water infiltration into, and leachate and gaseous emissions from, L-4.

As part of this closure regulation, several investigations are required prior to placement of a highly impermeable cap over the site. These investigations include a hydrogeologic investigation, an explosive gas investigation, a surface leachate investigation, and a disease vector analysis. These actions are deemed necessary by New York State prior to placement of capping material on a landfill. Some of these investigations have already been completed as a result of EPA's RI. A landfill closure investigation report will be needed to summarize the findings of the above investigations, after which the overall closure plan, including plans for placement of a cap over L-4, can be completed. This closure plan will be the subject of a 30 day public comment period. The New York State regulations require that the final slope of a cap should not be greater than 33 percent. At the present time, the side slopes for much of L-4 are very steep and there is limited area in which to expand the slopes. Other acceptable options may need to be examined during the development of the closure plan for L-4.

The design of the cap itself will include several layers of material (figure 11). First, a 12 inch gas venting layer of sand will be placed on L-4. Within this layer a perforated piping system will be placed to collect landfill gas and convey it to vertical vent pipes which will originate in the fill material and exit through the layers of subsequently placed materials. These vertical risers should be spaced at a maximum separation of 1 vent per acre; should be installed at least 3 feet into refuse, while extending 3 feet above the grade of the finished cap; and should be backfilled with a porous media. A low permeability layer will be placed on top of the gas venting layer to minimize infiltration of precipitation into the landfill, thereby reducing the production of leachate and landfill gas (from biological decomposition) within the fill. This layer can be either 18 inches of compacted clay with a maximum permeability of 10^{-7} centimeters per second, or it can be a 40 mil geosynthetic liner with a maximum permeability of 10^{-12} centimeters per second. This decision will be made during the development of the closure plan. A 24 inch barrier layer will be placed on top of the low permeability layer to act as a buffer for the underlying layers. Six inches of top soil will be placed last in order to promote vegetative growth on top of the cap. A post closure operations and maintenance plan will also be developed concurrently with the closure plan, and will govern all aspects of maintaining the selected remedy for a minimum of 30 years.

New active venting will be installed around the perimeter of L-4 to the north, south, and east in order to completely encircle the L-4 cell. Presently, EPA estimates that approximately 37 vents will be necessary to span the remaining perimeter area. These vents will be installed vertically on approximately 100 foot centers in the virgin soil around the base of L-4. The vents will be manifolded and connected to the existing compressor station, which presently has sufficient capacity to accommodate this expansion of the gas collection system. The wells should be drilled either to a depth of 50 feet below the deepest point of the landfill within 500 feet of the vent, or to groundwater, whichever is shallower. These vents should have 1 well control valve for every 40 feet of vertical vent pipe to maximize gas capture. These preliminary details may be modified during the actual design of the extension of the active venting system.

Although the existing HCU is considered capable of handling the increased flow of gases that will result from the expansion of the gas collection system, a second HCU will be added as a standby unit to assure continuous HCU operation during downtime of the existing HCU for maintenance or repairs.

In addition, the existing gas collection system will be rehabilitated in order to return it to its design capability and hence improve its operation and reliability. Based on the findings of the RI, the design radius of influence between the existing active vents has been judged sufficient to provide an effective and continuous barrier to off-site gas migration if the system is properly operated and maintained. It should be noted here that it was not conclusively determined during the RI whether this barrier extends deep enough to effectively capture gas at depth, although limited information from deep pressure monitoring equipment suggests that this is probably so. In any event, the monitoring of subsurface VOCs offsite during the RI and the subsequent data analysis for health risk indicate that even with the gas control system in need of rehabilitation, the migration of these substances offsite is presently not posing an unacceptable long-term health risk.

The rehabilitation of this system will include rebuilding the main gas collection header to allow for the increase in landfill grade due to capping L-4. Rebuilding the header will also permit correction of the inconsistent slope of the header, which presently allows landfill gas condensate to collect at low points in the header and to partially impede gas flow. The gas blowers which EPA evaluated during the RI and which at the time of EPA's evaluation were in a degraded state, have since been replaced by the Town as part of its operation and maintenance responsibility. The new blower plans were reviewed by EPA to assure that significant changes were not being made to the system which could conceivably affect the validity of data collected during the RI. However, these blowers have never been evaluated by EPA for technical acceptability. Such an evaluation will be performed during the design phase of this project.

Interim operation and maintenance procedures must be employed until a post closure operation and maintenance plan is agreed on by the EPA and DEC. It is EPA's belief, based on the RI, that subsurface landfill gas migration occurs offsite to the west within a matter of hours after all gas blowers are turned off. Since these migrations theoretically present an acute threat of explosion to the residences in immediate proximity to the landfill boundary, and since the threat is easily remedied by returning at least one blower to service, the operation of the gas blower system must be continuous during this phase. It is recommended that the combustion at the HCU be maintained by reducing its blower speed by changing the motor and/or sheaves, or by installing a variable frequency drive for the motor. If this adjustment fails to sustain combustion on a continuous basis, then a supplemental fuel source be utilized (typically propane gas).

As noted, EPA and DEC must agree on a final post closure and operation and maintenance plan. Prior to finalizing this plan, additional information needs to be collected and evaluated including information pertaining to the ability of the proposed gas collection system (under G-3) to support continuous combustion at the HCU.

If it is determined that the G-3 system by itself cannot support continuous combustion at the HCU then two options exist for the operation and maintenance of the HCU namely:

> 1) accomplish continous combustion at the HCU through the use of supplemental fuel, such as propane, or through the use of additional landfill gas captured via the gas collection system detailed under alternative G-4.
>
> 2) operate the HCU intermittently while the compressor station for the gas collection system operates continuously.

The second option (intermittent operation) could not be allowed to occur unless: (1) a risk assessment, using EPA methodology, was performed; and (2) the assessment indicated that such operation would not result in unacceptable risks to public health.

The following recommendations for operation and maintenance generally involve the existing landfill gas venting system. These recommendations will serve at a minimum as the basis for development of the comprehensive post-closure operation and maintenance plan to be developed during design.

*cleaning of sediment and water from all active vents
*development of a spare parts list
*maintenance of a spare parts inventory which stocks any component necessary for system operation that is not readily obtainable
*return of all active steel vents to service
*development of an active steel vent system performance monitoring plan and schedule
*development of a contingency plan to maintain operation of the active venting system during episodes of power outage.

In addition, approximately 3 groundwater extraction wells will be installed in the known area of high VOC concentrations (figure 12). The wells will pump extracted groundwater to a water treatment facility which will consist of an air stripping tower approximately 4 feet square and 18 feet tall. The discharge from the facility will be to a recharge basin(s), which will return the extracted groundwater to the aquifer of origin. Additional treatment at this facility, such as metals removal and treatment of stripper air emissions, will be evaluated during design to determine what treatment is necessary to operate the facility in compliance with all applicable Federal and State requirements. Exact locations for these wells and treatment facilities will be determined during design, when additional design sampling will be conducted to optimally site the wells, and property access considerations are fully explored.

The Selected Remedy also includes the return of the Southport well to service as a potable water supply through the addition of air stripping technology at the wellhead in order to remove volatile organic contamination and allow the treated well water to meet all Federal and State regulations applicable to potable water supplies. However, the Port Washington Water District has indicated to EPA that it is the belief of the Water District that the return of the Southport Well to service is presently premature, and should await the results of long term groundwater monitoring, after implementation of the extraction well program, before a decision is made when/whether to reactivate the well. Therefore, EPA will not proceed with the design of the air stripping facility at the Southport Well until such time that the Water District decides to reactivate the well, subject to EPA's review and analysis of monitoring data at that time to insure that the remedy as currently envisioned in this Record of Decision is still appropriate.

Under any circumstances, activation of planned extraction wells would be initiated prior to the return of the Southport well to service, in order to minimize the probability of drawing contamination from the localized area of relatively high VOC contamination at the western edge of L-4 into the Southport well.

EPA believes that additional landfill gas and groundwater monitoring locations are needed to satisfy several needs that have been identified during the RI and FS, and which have been previously described in this ROD, namely: to establish the exact placement of groundwater extraction wells; to further delineate the nature and extent of the northerly migration of groundwater contaminated with VOCs and leachate; to further characterize the migration of groundwater contamination towards Hempstead Harbor and the subsequent possible need to monitor the sediments and water of the Harbor; to monitor any progression of groundwater contaminated with VOCs or hazardous inorganics toward the study area's potable water supplies; and, to monitor the migration of landfill gas away from L-4 in all directions. Most of these proposed wells, in addition to wells already in existence, will also serve to monitor the effectiveness of EPA's selected remedial action.

The proposed new well locations are shown in figure 13. A specific monitoring plan and schedule will be developed during the design phase of this project.

STATUTORY DETERMINATIONS

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that achieve protection of human health and the environment. In addition, section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that when complete, the selected remedial action for this site must comply with applicable or relevant and appropriate environmental standards established under Federal and State environmental laws unless a statutory waiver is justified. The selected remedy also must be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as their principal element.

Protection of Human Health and the Environment

The selected remedy protects human health and the environment by preventing the offsite migration of contamination from L-4, as well as treating significant contamination presently existing offsite. Rehabilitation of the existing active venting system in conjunction with expanding it to completely encircle L-4 will effectively reduce the subsurface migration of gases to meet explosive gas requirements from 6 NYCRR Part 360, as well as to reduce any long-term health risks resulting from exposure to any hazardous residuals in the landfill gas which could occur if the gas seeps into offsite structures. Addition of a second HCU and the development of a comprehensive operation and maintenance plan as part of the closure plan will increase the reliability of the gas withdrawal system to prevent offsite gas migration.

The treatment of groundwater at the Southport Well to meet all applicable potable water regulatory requirements would effectively safeguard all potential users of the Southport Well. However, the Port Washington Water District has indicated its belief to EPA that it is premature to return the Southport Well to service. Therefore, while the Well remains out of service, the protection of public health in this regard would still be protected, albeit the Well resource would continue to be unavailable.

Commencement of the groundwater extraction well system prior to the startup of the Southport well will safeguard against the migration of the area of elevated VOC contamination toward the Southport well, if and when the Southport Well is eventually returned to service.

Compliance With Applicable or Relevant and Appropriate Standards

Closure of the L-4 section will meet the State sanitary landfill closure requirements as specified under 6 NYCRR Part 360. This remedial action, particularly the placement of a highly impermeable cap over the landfill's surface, will hasten reduction in the amount of leachate and landfill gas generated by the landfill by restricting the infiltration of water. Leachate and landfill gas represent the two physical media in which hazardous constituents in L-4, or any other sanitary landfill, make their way offsite. Utilization of a specially designed cap as described earlier under the selected remedy will prevent the buildup of landfill gases initially upon placement of the cap.

Placement of extraction wells, with subsequent treatment and return of the extracted groundwater into the aquifer of origin will hasten the cleanup of the Upper Glacial Aquifer in the area of elevated VOCs to maximum contaminant levels as specified in the Safe Drinking Water Act (40 CFR 141) and New York State Groundwater Quality Regulations (6 NYCRR Part 701 which incorporates 10 NYCRR Subpart 5-1). EPA believes that it is appropriate at Superfund sites to apply these requirements to points within an aquifer if the aquifer is used as a source of potable water. The treated groundwater will also meet these requirements prior to discharge to the recharge basin. Discharge of treated groundwater from the extraction system into aquifer recharge basins satisfies the State policy of conservation of potable water quantity in Nassau County.

The air stripping technology at the Southport well will also be designed to meet the above noted maximum contaminant levels for drinking water supplies. The addition of the air stripper will be subject to the availability of Federal funding and the re-establishment of the need for treatment at the Southport Well at the point in time when the Port Washington Water District determines to return the Well to service.

Air emissions from the above noted air stripping systems will be required to meet the requirements of 6 NYCRR Parts 201, 202, 211, and 231 since the site is in a non-attainment area for ozone.

Installation of new landfill gas and groundwater monitoring wells, and development of a long-term monitoring plan using these and the existing well network, will demonstrate the effectiveness of this selected remedy, as well as achieve the other monitoring objectives as described under **SELECTED REMEDY.**

Cost Effectiveness

The selected remedy is cost-effective because it has been determined to provide overall effectiveness proportional to its costs (present worth= $42,580,000).

Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable and Preferrence for Treatment as a Principal Element

The element treatment technologies to effect permanent solutions at Superfund sites is not practicable at some sites with large volumes of low concentration wastes, such as L-4. These remedies are typically difficult to implement and prohibitively expensive. Therefore, the range of alternatives for source control was focused on containment options.

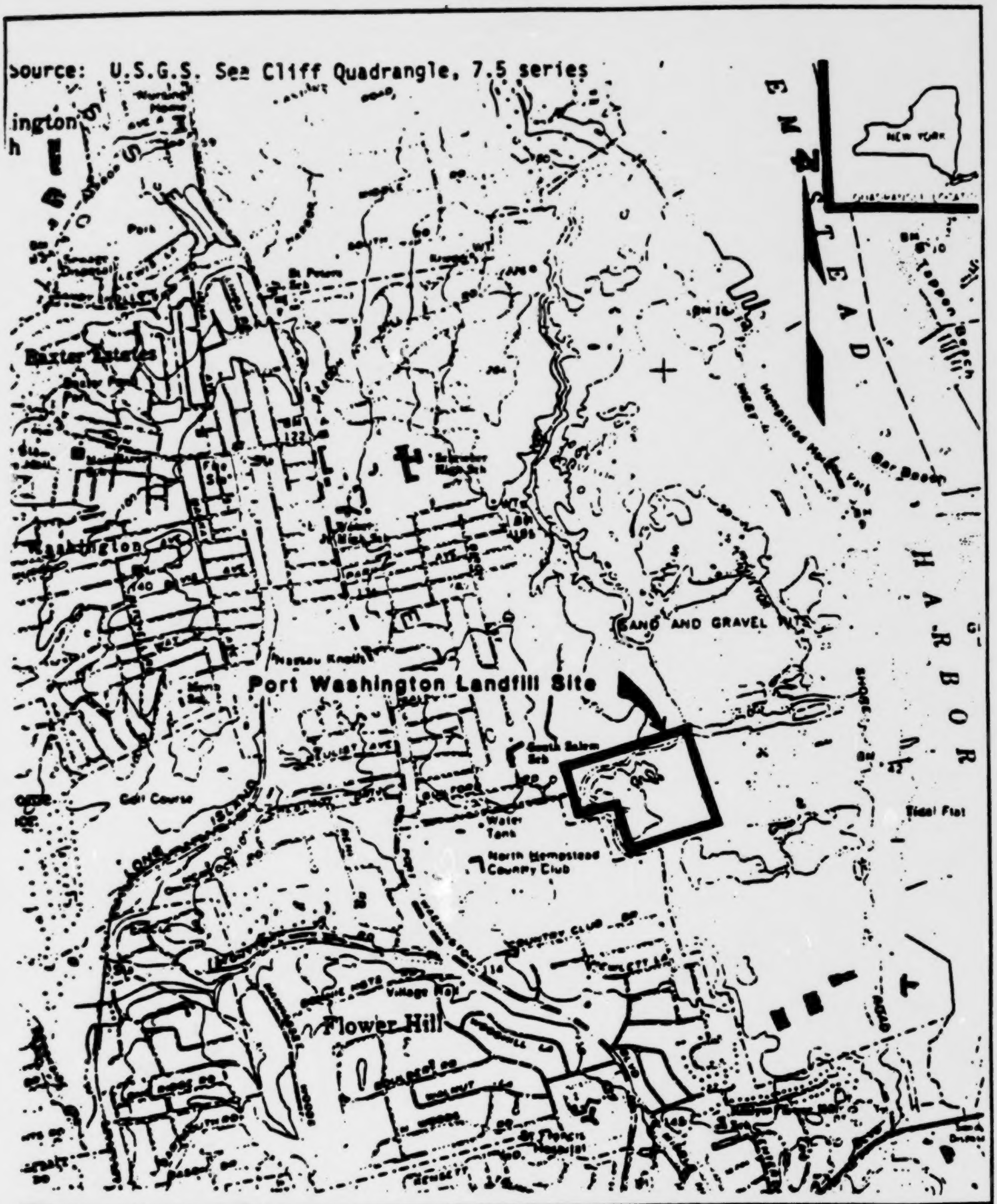
On the other hand, EPA has selected treatment technology to permanently reduce the levels of contamination that have migrated offsite in the Upper Glacial Aquifer. EPA also believes that the permanent destruction of organic compounds afforded by the HCU flare must be maintained until such time that it is determined whether continuous operation of the HCU is necessary to safeguard public health.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the Port Washington Landfill was released to the public in July 1989. The Proposed Plan identified Alternatives G-3 and W-3 to control the source and manage migration respectively. EPA reviewed all comments submitted during the public comment period. Upon review of these comments, it was determined that no significant changes to the selected remedy, as it was originally identified in the Proposed Plan, were necessary. The public did raise specific concerns regarding the ability for the gas collection system (under G-3) to maintain continuous combustion at the HCU and felt the G-4 collection system might provide a more effective and reliable means of maintaining combustion. It should be noted that the **Selected Remedy** has addressed these concerns. As stated in the **Selected Remedy**, additional landfill gas captured via a gas collection system detailed under G-4 could be utilized as an optional source of supplemental fuel should the design phase indicate that this is the preferred means of achieving the remedial action objectives of G-3.

APPENDIX 1 - FIGURES

FIGURE 1


Source: U.S.G.S. Sea Cliff Quadrangle, 7.5 series

NEW YORK
Baxter Estates
Washington
Port Washington Landfill Site
SAND AND GRAVEL PITS
South Salem Sch
Water Tank
North Hempstead Country Club
Golf Course
Flower Hill
Village Hall
Nassau Knolls
Schreiber High Sch
Bar Beach
Tidal Flat
Hempstead Harbor Park
HEMPSTEAD HARBOR

CDM

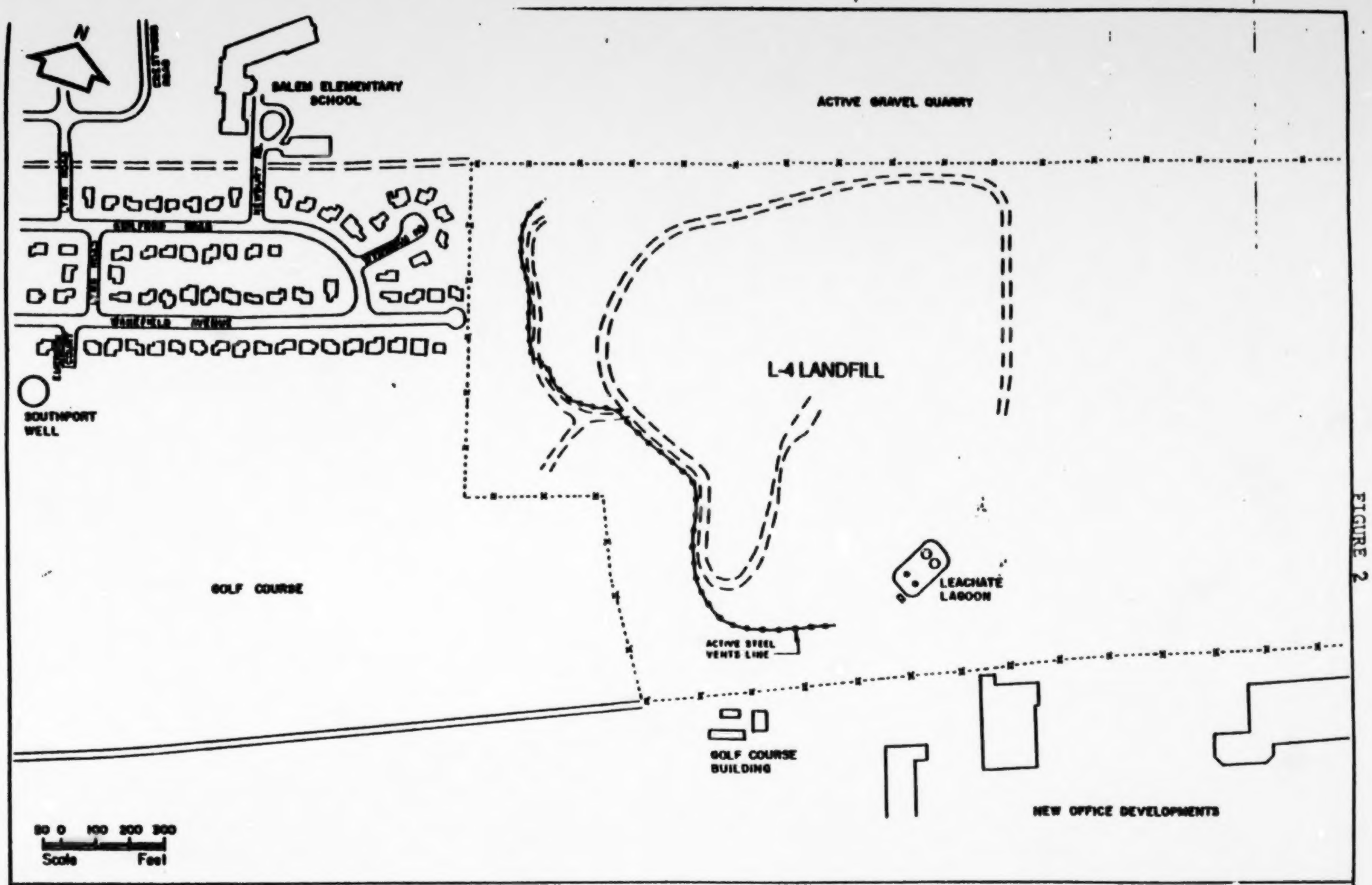
environmental engineers, scientists, planners & management consultants

Reproduced from best available copy.

Site Location Map

Port Washington Landfill, Port Washington, New York

FIGURE 2


N
SALEM ELEMENTARY SCHOOL
WAKEFIELD AVENUE
SOUTHPORT WELL
ACTIVE GRAVEL QUARRY
L-4 LANDFILL
LEACHATE LAGOON
ACTIVE STEEL VENTS LINE
GOLF COURSE
GOLF COURSE BUILDING
NEW OFFICE DEVELOPMENTS
50 0 100 200 300
Scale Feet

CDM
environmental engineers, scientists, planners & management consultants

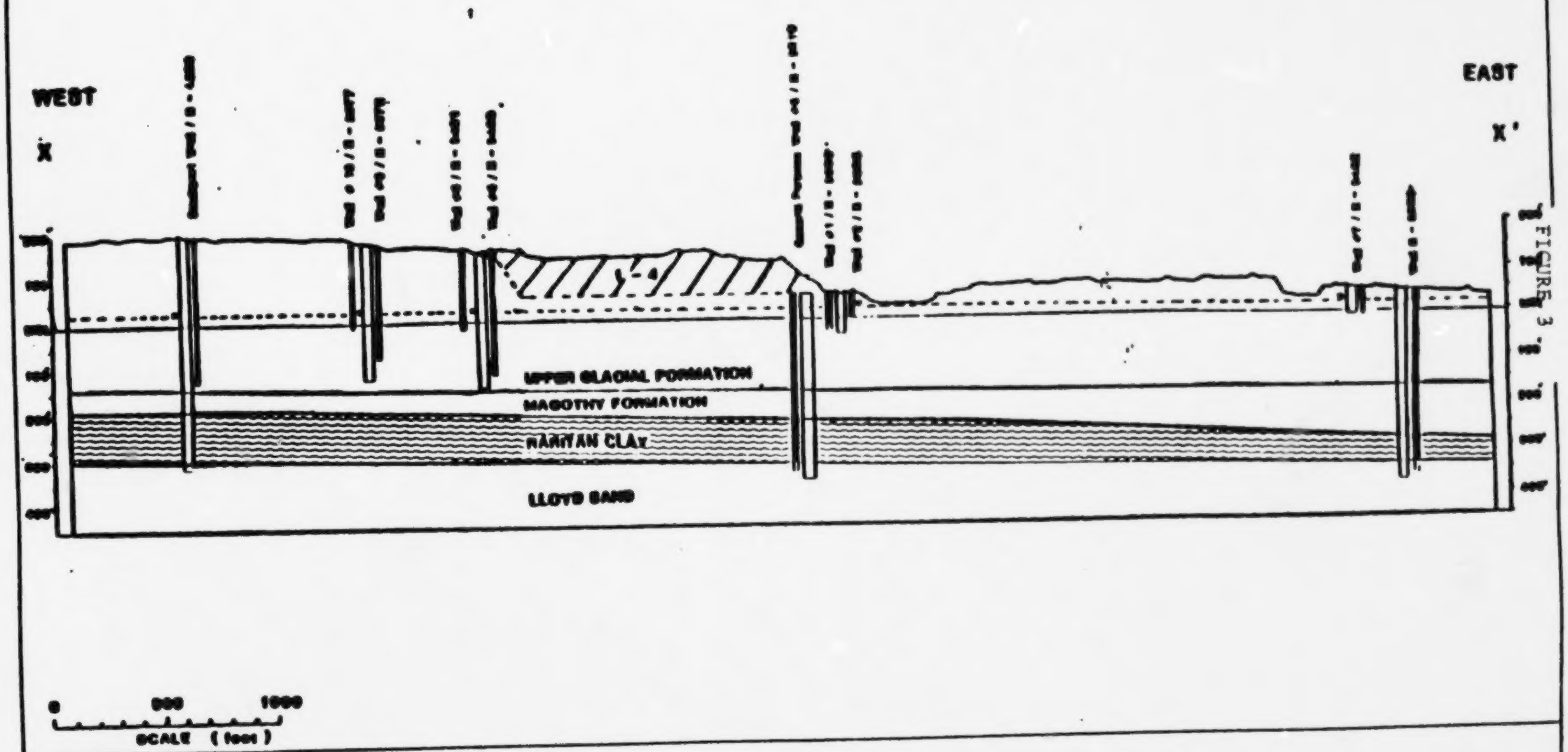
Immediate Landfill Area

Port Washington, Nassau County, New York

FIGURE 3

WEST – EAST GEOLOGIC CROSS – SECTION

(Geologic contacts based on information by Henderson and Casey, and Chabot Kilburn)


WEST
X
EAST
X'
UPPER GLACIAL FORMATION
MAGOTHY FORMATION
RARITAN CLAY
LLOYD SAND
0
500
1000
SCALE (feet)

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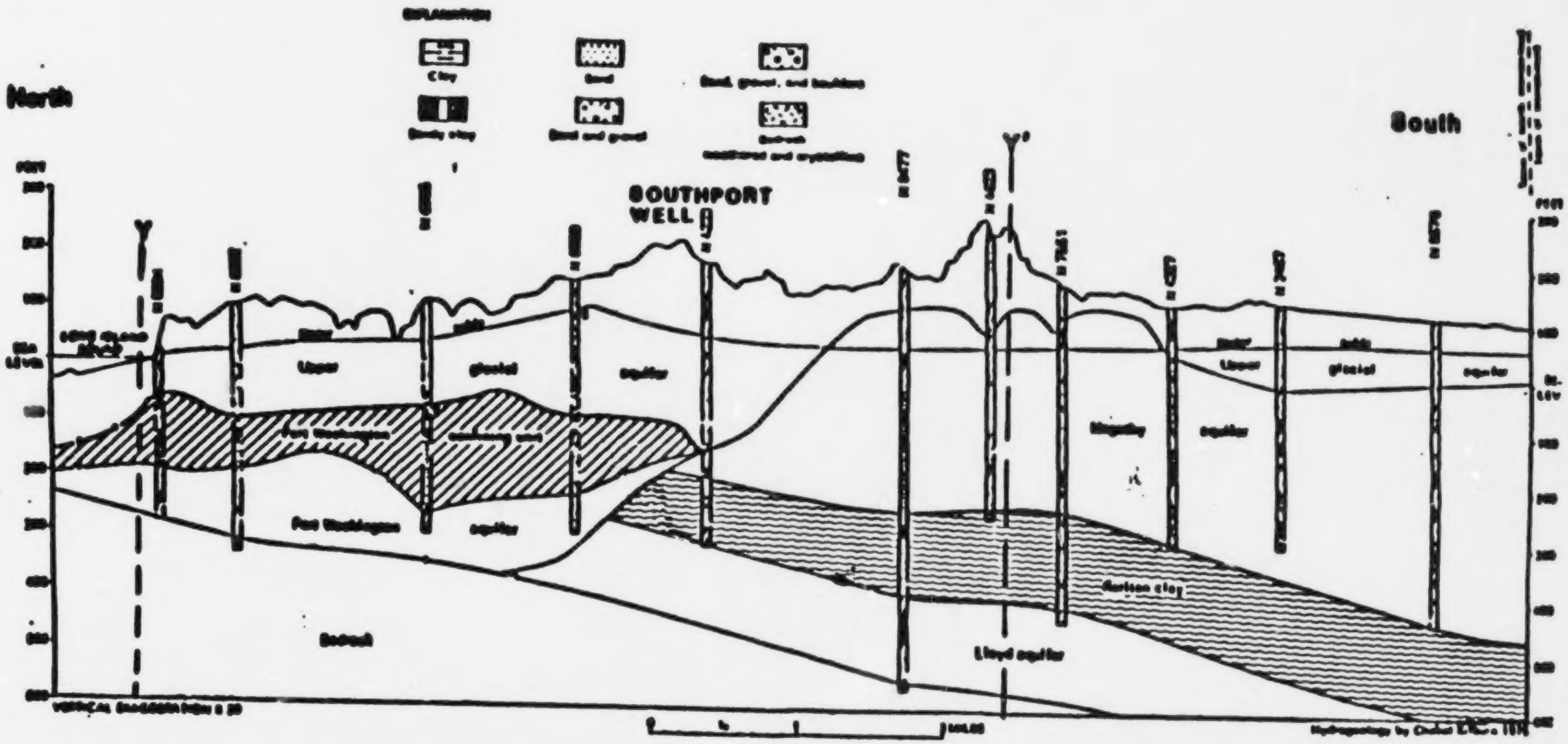
West-East Geologic Cross-Section

Port Washington, Nassau County, New York

FIGURE 4


EXPLANATION
Clay
Sandy clay
Sand
Sand and gravel
Sand, gravel, and boulders
Bedrock weathered and crystalline
North
South
SOUTHPORT WELL
FEET
SEA LEVEL
Upper glacial aquifer
Port Washington confining unit
Port Washington aquifer
Bedrock
Magothy aquifer
Raritan clay
Lloyd aquifer
MILES

*The Port Washington Landfill is located approximately 1,300 feet east of the Southoort Well

Source: Kilburn, 1979

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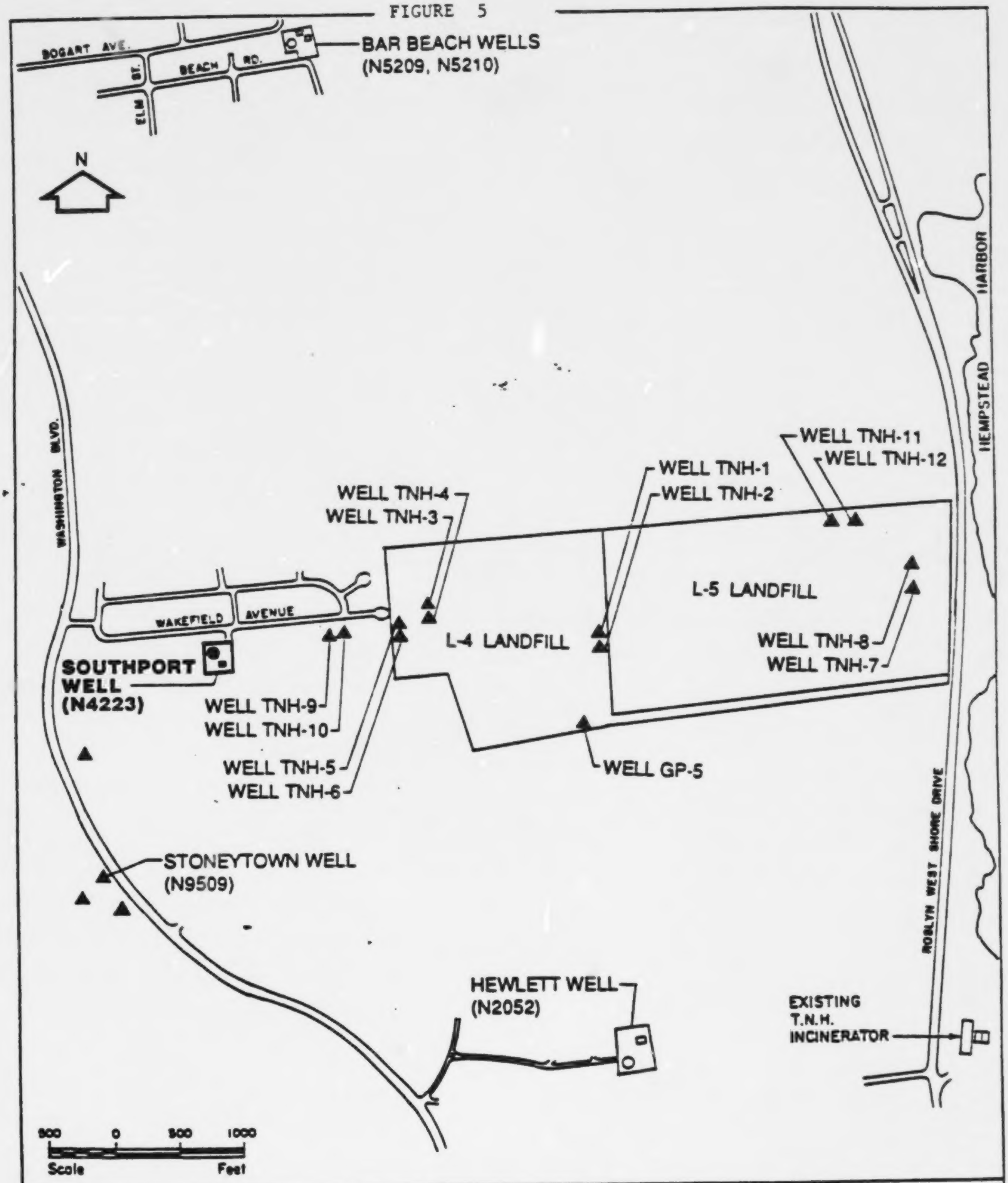
North-South Geologic Cross-Section of Manhasset Neck

Port Washington, Nassau County, New York

FIGURE 5


BOGART AVE.
ELM ST.
BEACH RD.
BAR BEACH WELLS
(N5209, N5210)
N
WASHINGTON BLVD.
HEMPSTEAD HARBOR
WAKEFIELD AVENUE
SOUTHPORT WELL
(N4223)
WELL TNH-4
WELL TNH-3
WELL TNH-1
WELL TNH-2
WELL TNH-11
WELL TNH-12
L-5 LANDFILL
L-4 LANDFILL
WELL TNH-8
WELL TNH-7
WELL TNH-9
WELL TNH-10
WELL TNH-5
WELL TNH-6
WELL GP-5
STONEYTOWN WELL
(N9509)
ROSLYN WEST SHORE DRIVE
HEWLETT WELL
(N2052)
EXISTING
T.N.H.
INCINERATOR
500
0
500
1000
Scale
Feet

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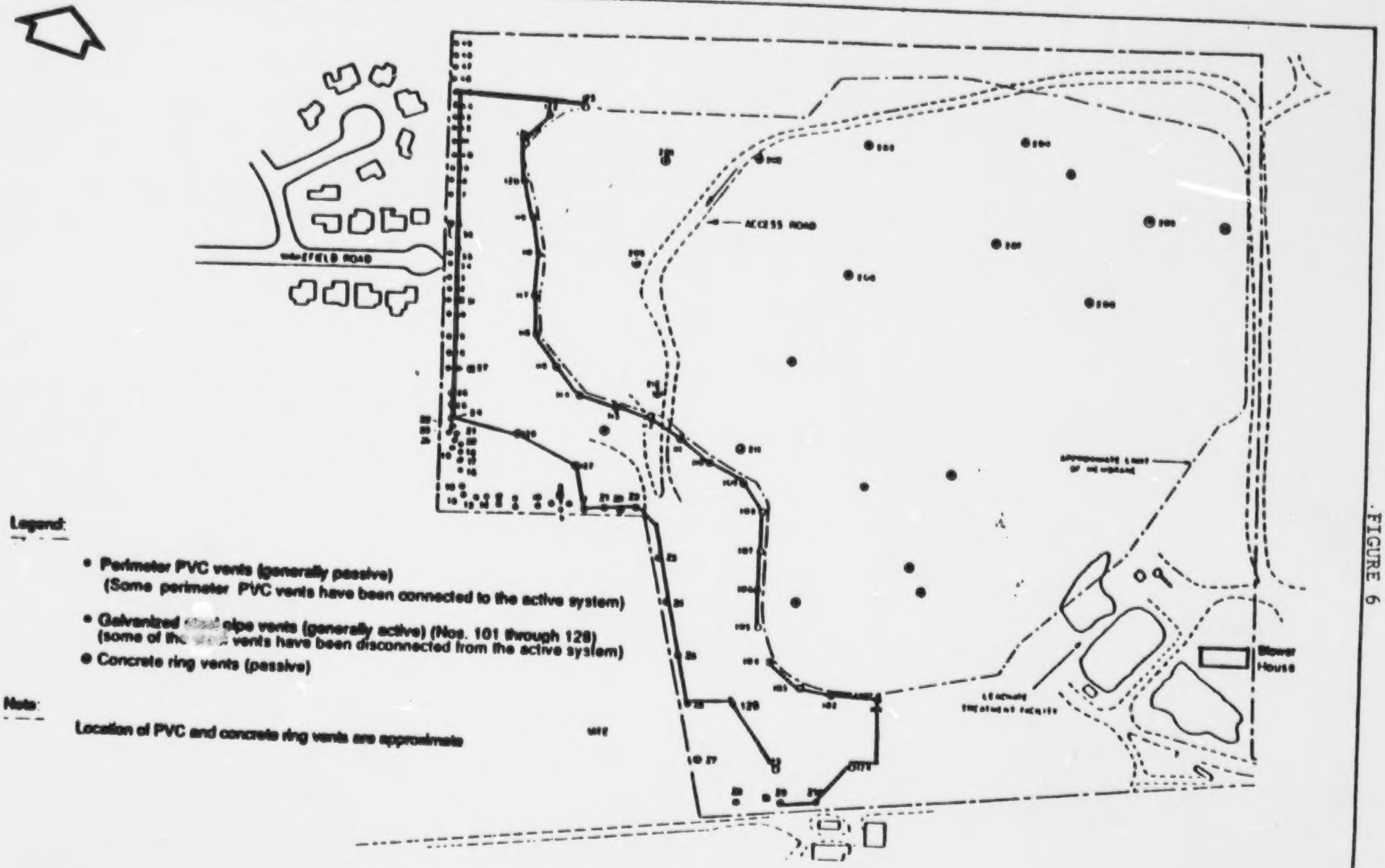
Location of Area Wells

Port Washington Landfill, Port Washington, New York

FIGURE 6


WAKEFIELD ROAD
ACCESS ROAD
APPROXIMATE LIMIT OF MEMBRANE
LEACHATE TREATMENT FACILITY
Blower House
120
101
128

Legend:

- Perimeter PVC vents (generally passive)
  (Some perimeter PVC vents have been connected to the active system)
- Galvanized steel pipe vents (generally active) (Nos. 101 through 128)
  (some of the steel vents have been disconnected from the active system)
- ● Concrete ring vents (passive)

Note:

Location of PVC and concrete ring vents are approximate

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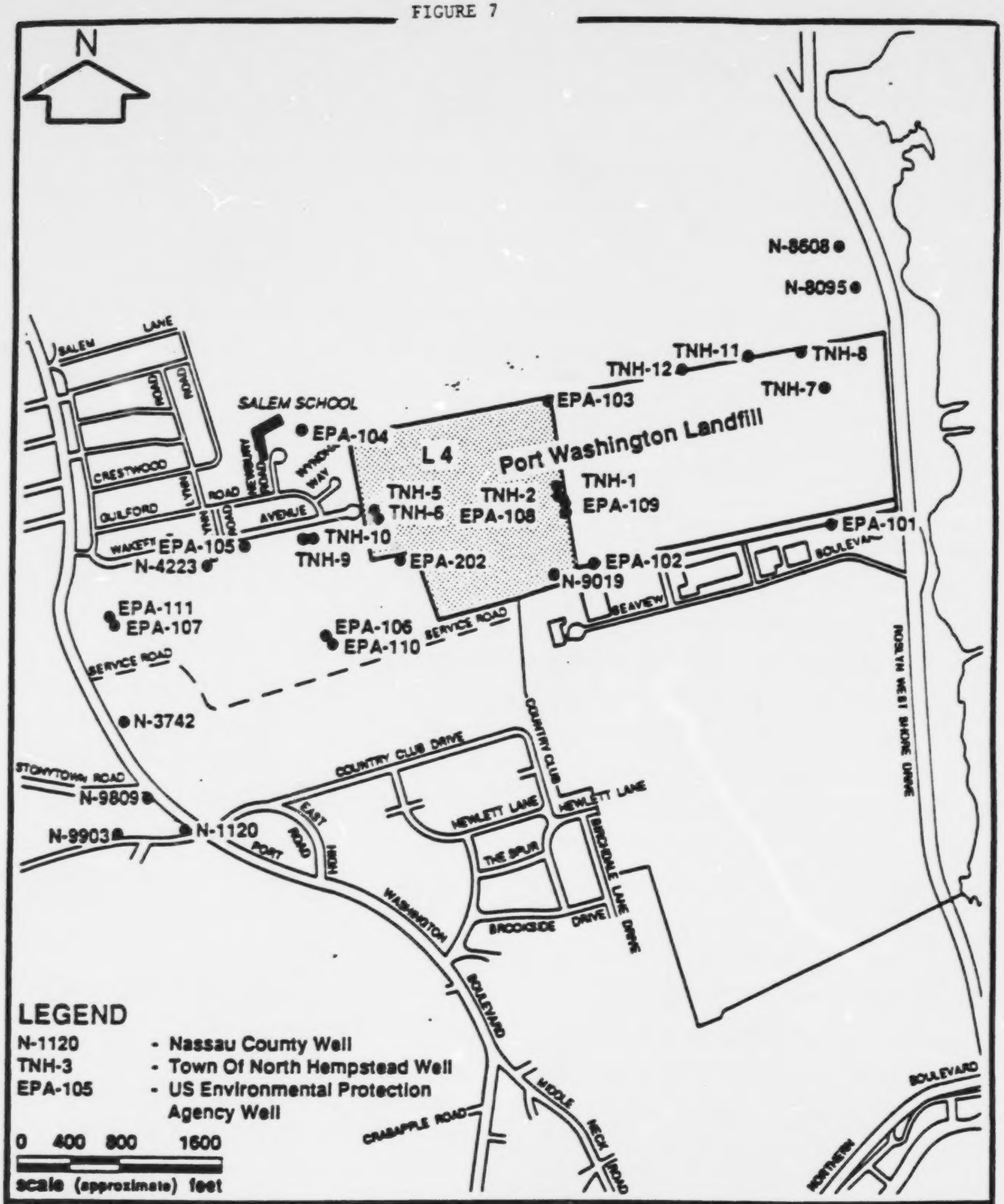
planners & management consultants

Gas Management System Layout

Port Washington Landfill, Port Washington, New York

FIGURE 7


N
N-8608
N-8095
TNH-11
TNH-8
TNH-12
TNH-7
EPA-103
SALEM SCHOOL
EPA-104
L 4
Port Washington Landfill
TNH-1
EPA-109
TNH-5
TNH-6
TNH-2
EPA-108
TNH-10
TNH-9
EPA-202
EPA-101
EPA-102
N-9019
EPA-105
N-4223
EPA-111
EPA-107
EPA-106
EPA-110
N-3742
N-9809
N-9903
N-1120
SALEM
LANE
ROAD
CRESTWOOD
GUILFORD
WAKEFIELD
AVENUE
WYNDHAM WAY
BOULEVARD
SEAVIEW
SERVICE ROAD
SERVICE ROAD
COUNTRY CLUB
COUNTRY CLUB DRIVE
HEWLETT LANE
HEWLETT LANE
THE SPUR
BIRCHDALE LANE
DRIVE
BROOKSIDE
DRIVE
STONYTOWN ROAD
EAST
ROAD
HIGH
PORT
WASHINGTON
BOULEVARD
MIDDLE
NECK
ROAD
CRABAPPLE ROAD
NORTHERN
BOULEVARD
ROSLYN WEST SHORE DRIVE
LEGEND
N-1120 - Nassau County Well
TNH-3 - Town Of North Hempstead Well
EPA-105 - US Environmental Protection Agency Well
0 400 800 1600
scale (approximate) feet

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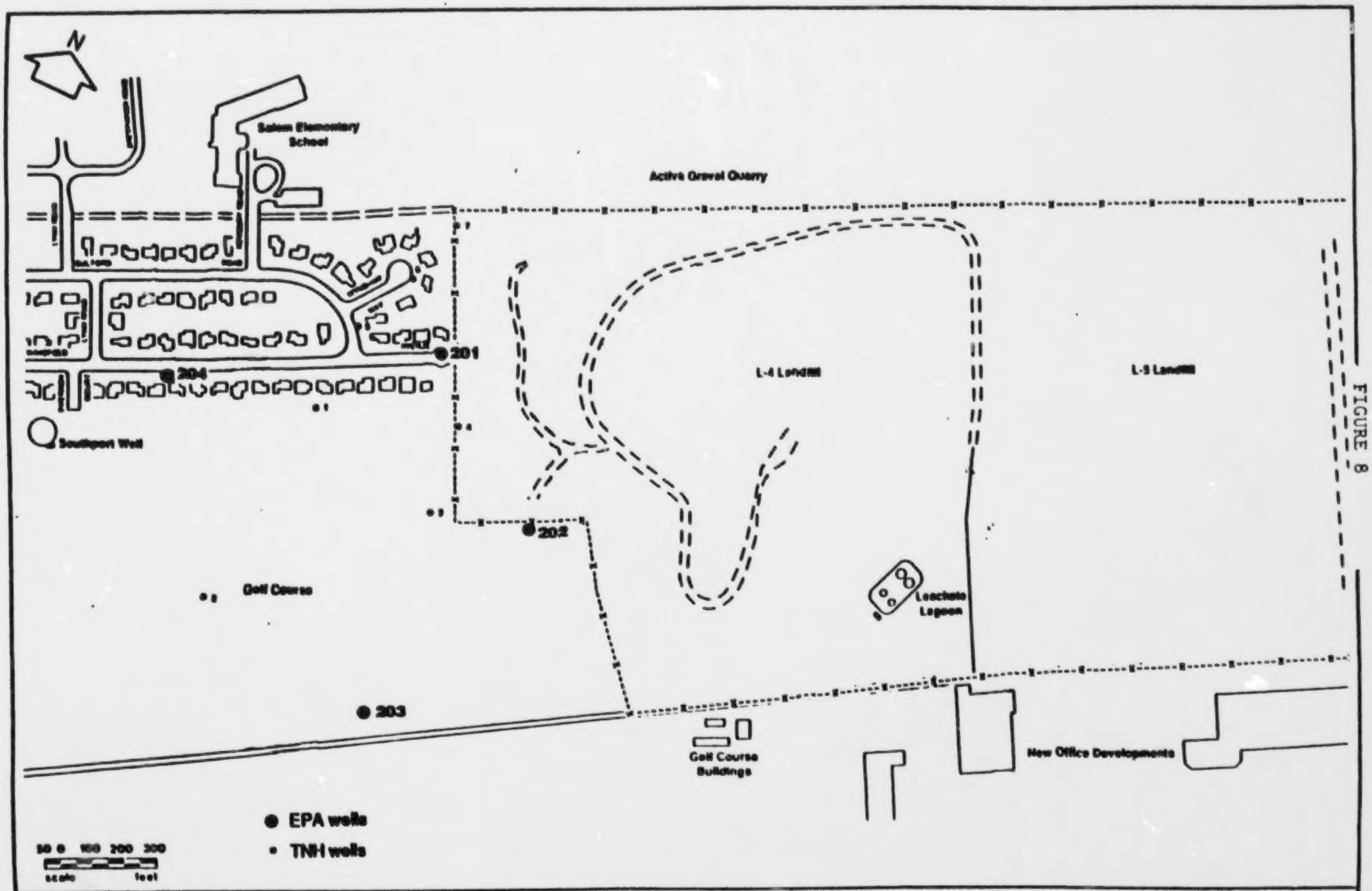
Location Of Ground Water Monitoring Wells

Port Washington Landfill, Port Washington, New York

FIGURE 8


N
Salem Elementary School
Active Gravel Quarry
L-4 Landfill
L-3 Landfill
201
202
203
204
Southport Well
Golf Course
Leachate Lagoon
Golf Course Buildings
New Office Developments
● EPA wells
• TNH wells
50 0 100 200 300
scale
feet

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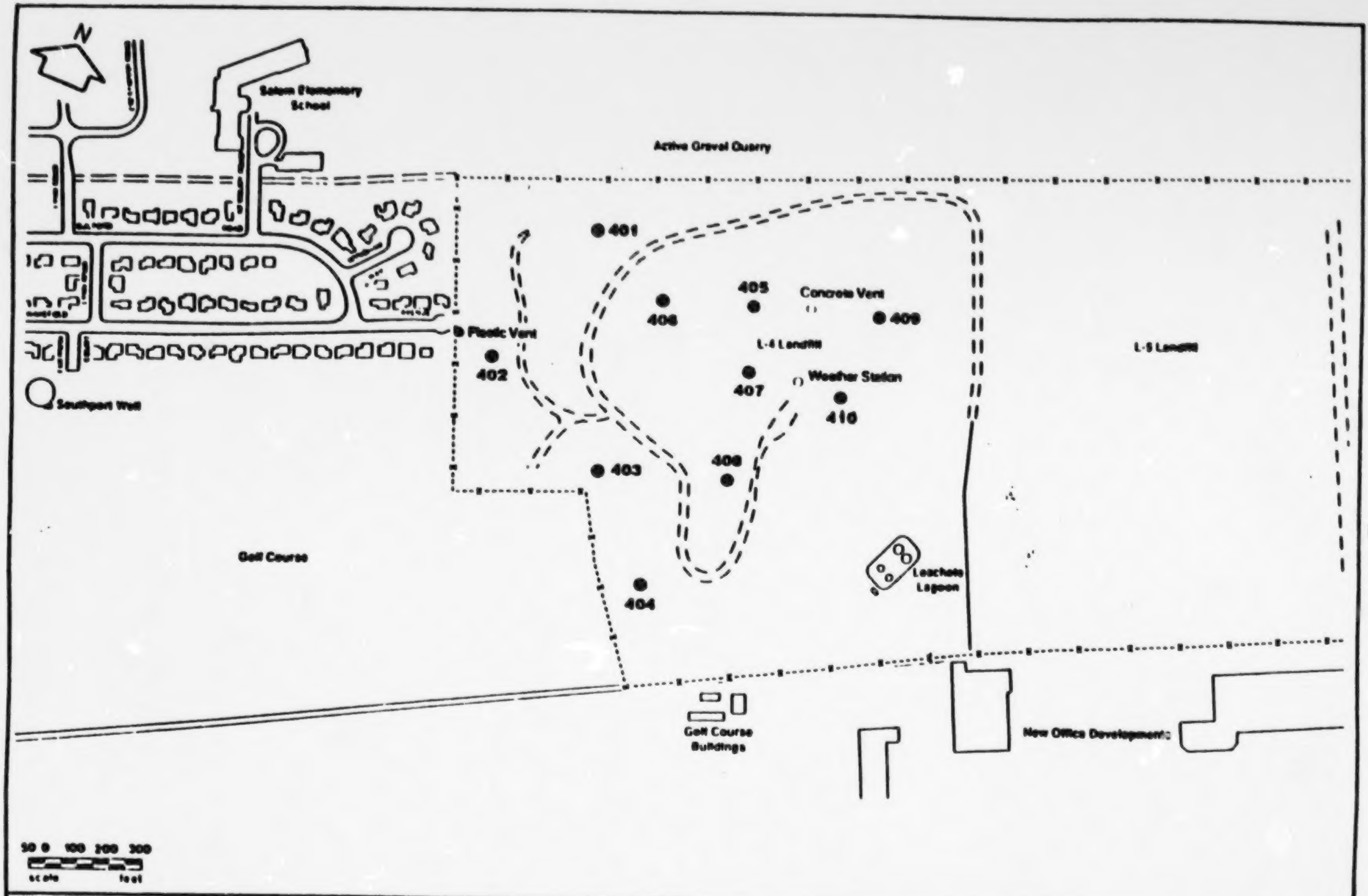
Location of Landfill Gas Monitoring Wells

Port Washington Landfill, Port Washington, New York

FIGURE 9


N
Salem Elementary School
Active Gravel Quarry
401
402
403
404
405
406
407
408
409
410
Plastic Vent
Concrete Vent
L-4 Landfill
Weather Station
L-5 Landfill
Leachate Lagoon
Southport Well
Golf Course
Golf Course Buildings
New Office Development
50 0 100 200 300
scale feet

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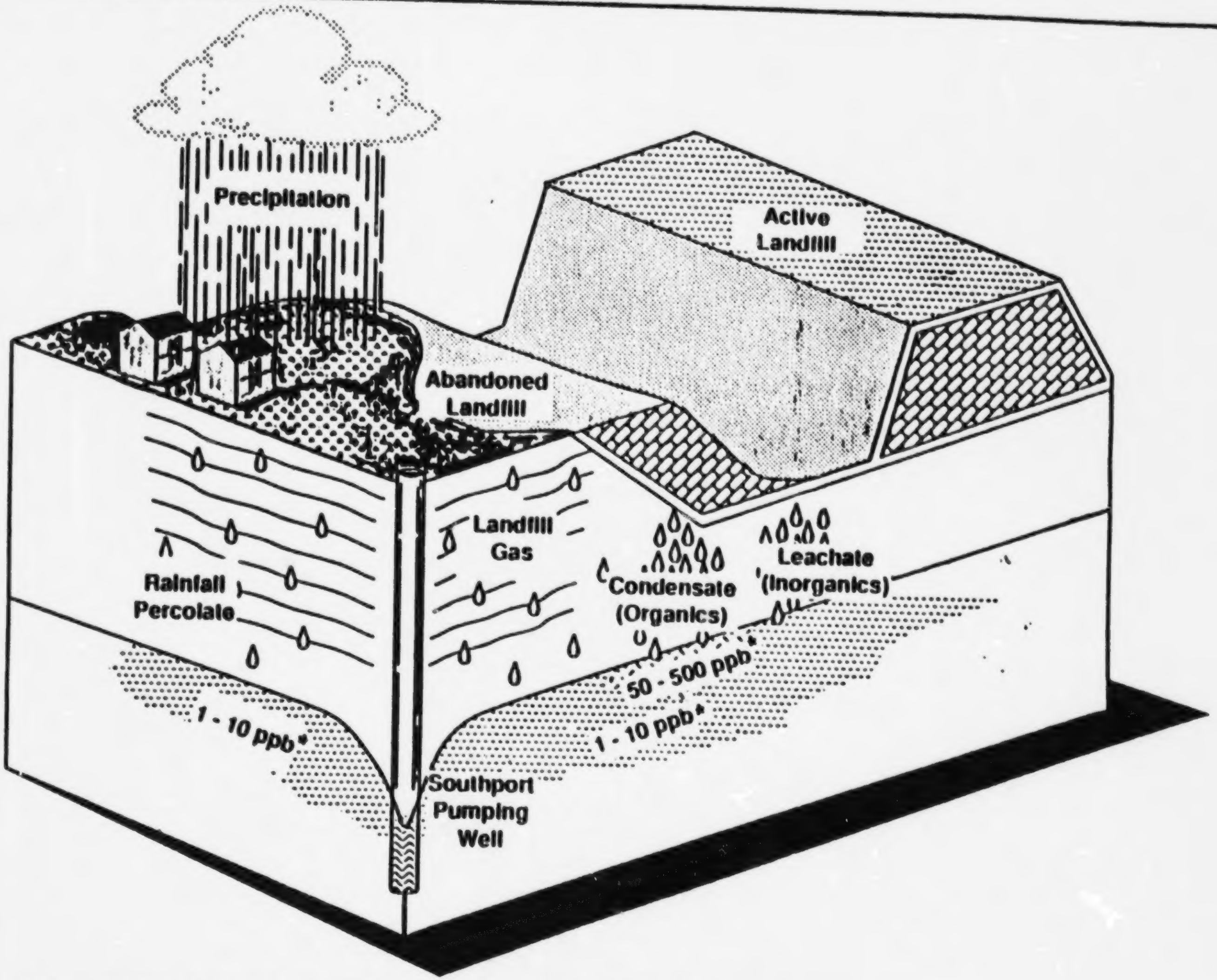
Approximate Location of Flux Box Stations

Port Washington Landfill, Port Washington, New York

FIGURE 10


Precipitation
Active Landfill
Abandoned Landfill
Landfill Gas
Rainfall Percolate
Condensate (Organics)
Leachate (Inorganics)
50 - 500 ppb*
1 - 10 ppb*
1 - 10 ppb*
Southport Pumping Well

NOTE: * – Concentrations Representative Of Total Volatile Organic Priority Pollutants

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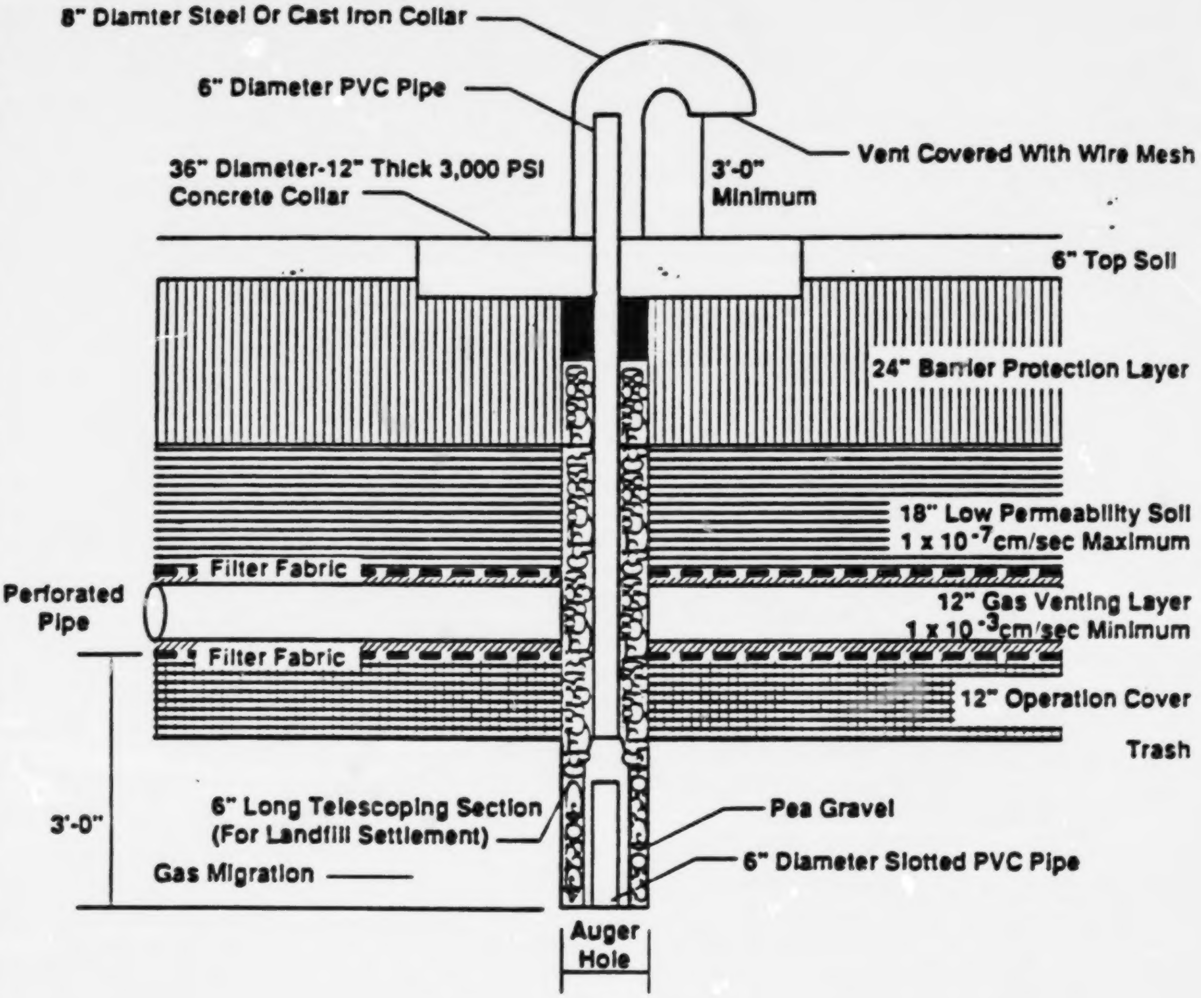
Conceptual Block Diagram
Of Contaminant Transport
Port Washington Landfill, Port Washington, New York

FIGURE 11


8" Diamter Steel Or Cast Iron Collar
6" Diameter PVC Pipe
Vent Covered With Wire Mesh
36" Diameter-12" Thick 3,000 PSI Concrete Collar
3'-0" Minimum
6" Top Soil
24" Barrier Protection Layer
18" Low Permeability Soil
1 x 10 -7cm/sec Maximum
Filter Fabric
Perforated Pipe
12" Gas Venting Layer
1 x 10 -3cm/sec Minimum
Filter Fabric
12" Operation Cover
Trash
6" Long Telescoping Section (For Landfill Settlement)
Pea Gravel
3'-0"
6" Diameter Slotted PVC Pipe
Gas Migration
Auger Hole

Not To Scale

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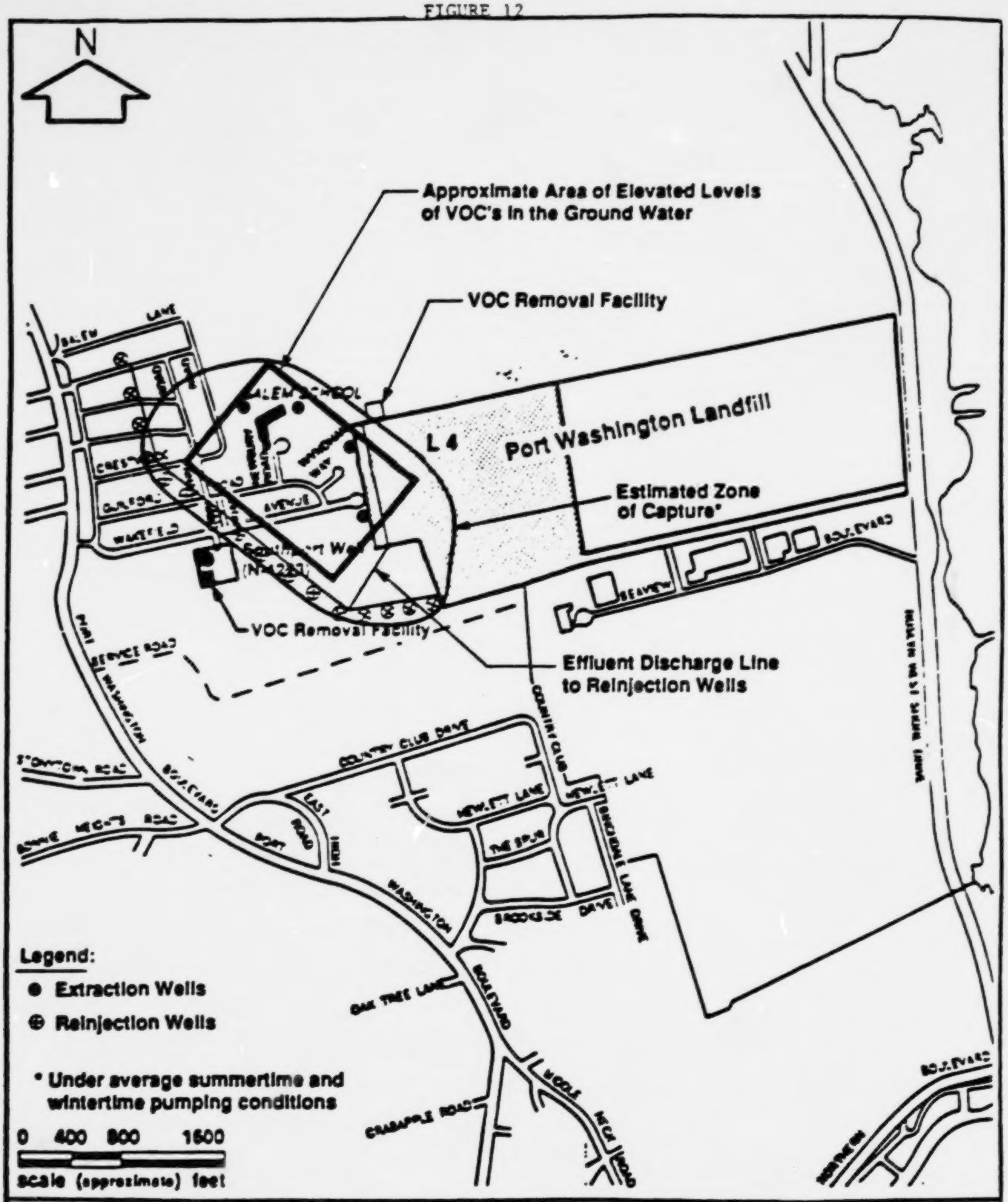
Landfill Capping Detail

Port Washington Landfill, Port Washington, New York

FIGURE 12


N
Approximate Area of Elevated Levels of VOC's in the Ground Water
VOC Removal Facility
Port Washington Landfill
L 4
Estimated Zone of Capture*
VOC Removal Facility
Effluent Discharge Line to Reinjection Wells
Salem School
Country Club Drive
Newlett Lane
The Spur
Brookside Drive
Port Washington Boulevard
Oak Tree Lane
Crabapple Road
Middle Neck Road
Country Club
Seaview
Boulevard
Service Road
Legend:
● Extraction Wells
⊕ Reinjection Wells
* Under average summertime and wintertime pumping conditions
0 400 800 1600
scale (approximate) feet

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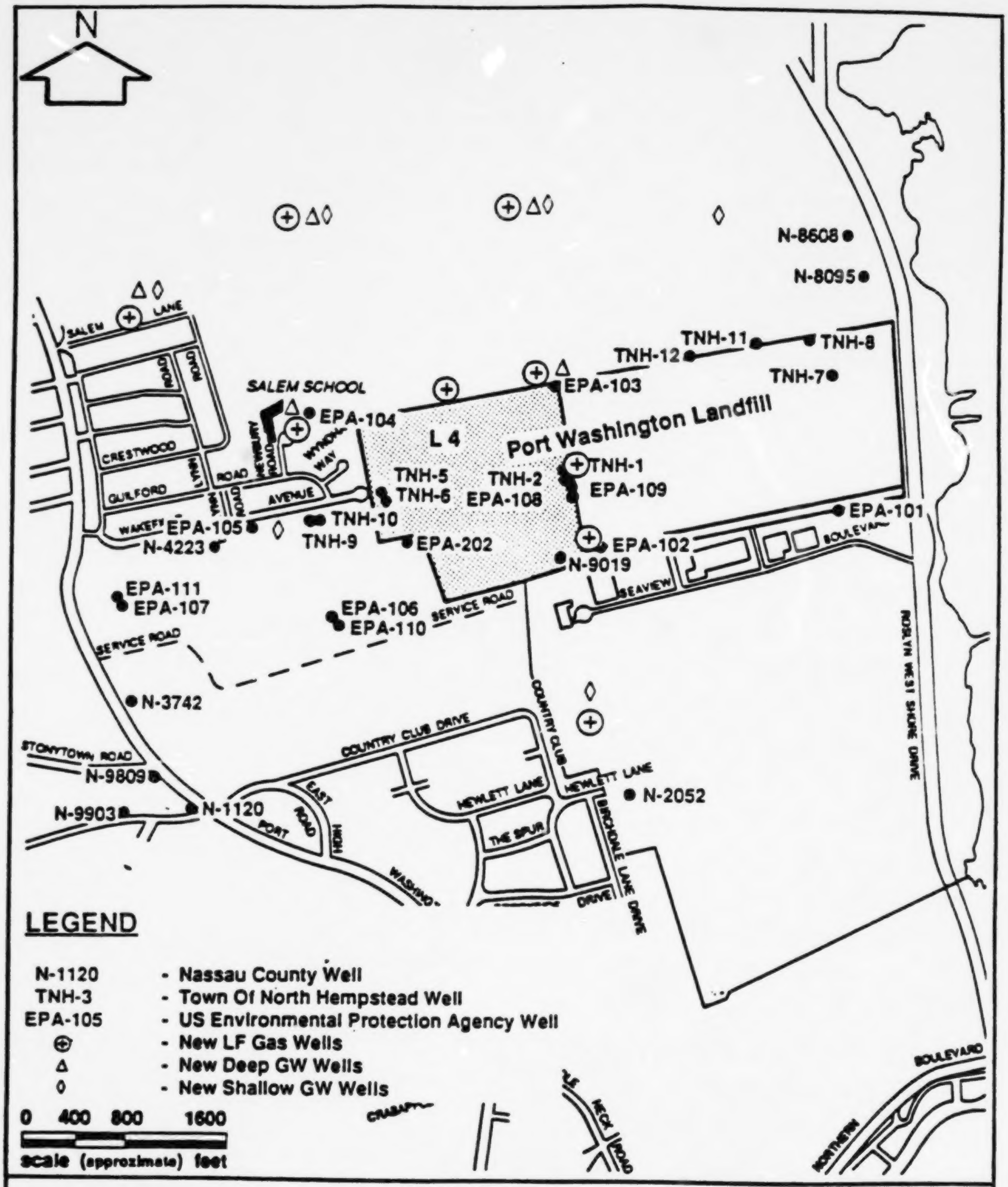
Location Of Facilities - Alternative W-3

Port Washington Landfill, Port Washington, New York

FIGURE 13


N
Port Washington Landfill
L 4
SALEM SCHOOL
SALEM LANE
CRESTWOOD
GUILFORD
WAKEFIELD
AVENUE
ROAD
WYNDHAM WAY
SERVICE ROAD
SEAVIEW
BOULEVARD
ROSLYN WEST SHORE DRIVE
COUNTRY CLUB
COUNTRY CLUB DRIVE
HEWLETT LANE
THE SPUR
BIRCHDALE LANE
DRIVE
STONYTOWN ROAD
EAST ROAD
PORT WASHINGTON
CRABAPPLE
NECK ROAD
NORTHERN BOULEVARD
N-8608
N-8095
TNH-11
TNH-8
TNH-12
TNH-7
EPA-103
EPA-104
TNH-1
EPA-109
TNH-5
TNH-6
TNH-2
EPA-108
TNH-10
TNH-9
EPA-105
N-4223
EPA-202
EPA-102
N-9019
EPA-101
EPA-111
EPA-107
EPA-106
EPA-110
N-3742
N-9809
N-9903
N-1120
N-2052
LEGEND
N-1120 - Nassau County Well
TNH-3 - Town Of North Hempstead Well
EPA-105 - US Environmental Protection Agency Well
⊕ - New LF Gas Wells
Δ - New Deep GW Wells
◊ - New Shallow GW Wells
0 400 800 1600
scale (approximate) feet

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L-4 Environmental Monitoring Program

Port Washington Landfill, Port Washington, New York

APPENDIX 2 - TABLES

TABLE 1

CHEMICALS OF POTENTIAL CONCERN SUMMARY (a)

	SOIL	GROUND WATER	LEACHATE	LANDFILL GAS (b)	CONDENSATE (b)
ORGANICS					
Acetone				X	X
Benzene	X	X	X	X	X
Benzoic acid	X	X	X		
Benzyl butyl phthalate	X				
Bis(2-ethylhexyl)phthalate	X	X	X		
2-Butanone	X		X	X	X
Chlorobenzene		X	X	X	X
Chloroethane		X	X		
Chloroform	X	X		X	
4,4'-DDT	X	X			
1,1-Dichloroethane		X	X	X	
1,2-Dichloroethane				X	
1,1-Dichloroethene		X		X	
1,2-Dichloroethene		X	X		X
1,2-Dichloroethene				X	
1,2-Dichloropropane				X	
1,3-Dichloropropene		X			
Diethyl phthalate	X				
Di-n-butyl phthalate	X	X			
Di-n-octyl phthalate	X	X			
Ethylbenzene			X	X	X
2-Hexanone					X
4-Methyl-2-pentanone			X		X
Methylene chloride		X		X	
Naphthalene			X		
Tetrachloroethene	X	X		X	
Toluene	X		X	X	X
1,1,1-Trichloroethane		X	X	X	
1,1,2-Trichloroethane				X	
1,1,2,2-Tetrachloroethane				X	
Trichloroethene	X	X		X	
Vinyl chloride		X	X	X	
Xylene		X	X	X	X
INORGANICS					
Aluminum		X	X		
Antimony	X				
Arsenic		X	X		
Barium		X	X		
Cadmium	X	X	X		
Calcium	X				
Chromium		X			
Copper		X			
Cyanide	X	X	X		
Iron		X			
Lead		X			
Manganese		X			
Mercury	X	X			
Nickel		X	X		
Potassium		X	X		
Selenium	X		X		
Silver	X	X	X		
Sodium		X	X		
Thallium			X		
Vanadium		X			
Zinc		X			

(a) Blanks indicate that the chemical was either not detected or was not selected as a chemical of potential concern (because of infrequent detections or comparison to background levels), with the exception of inorganics which were not sampled for in landfill gas and condensate.

(b) These media were sampled for organic chemicals only.

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TABLE 2

Summary of Source Control Remedial Alternatives

Components	Alternative G-1	Alternative G-2	Alternative G-3	Alternative G-4
Landfill capping per 6 NYCRR part 360	Included	Included	Included	Included
Existing active vents	Leave in present state	Clean out sediment and water. Place disconnected vents back into service	Same as alternative G-2 but add new active vents to completely ring the perimeter of L-4	Same as alternative G-3 but add new active vents throughout the interior of L-4 and modify leachate drain tile system to become part of the active venting system
Existing perimeter plastic passive vents	Leave in present state	Leave in present state	Tie-in to active venting system	Tie-in to active venting system
Existing concrete cisterns	Leave in present state	Leave in present state	Leave in present state	Tie-in to active venting system
Blower house	Leave in present state	Upgrade blowers so they all are operational	Upgrade blowers so they all are operational	Upgrade blowers so they all are operational
Combustion unit (HCU)	Leave in present state	Operate according to design specifications. Use supplemental fuel when necessary	Add one new HCU as a standby unit. Modify existing unit to reduce combustion air blower speed. Use supplemental fuel if necessary	Add one new HCU for use in normal operation. Modify existing unit to reduce combustion air blower speed. Use supplemental fuel if necessary
Existing gas header	Leave in present state	Rebuild to eliminate vacuum leaks and to provide for proper condensate drainage	Same as alternative G-2 but add additional header to accommodate new active vents	Same as alternative G-3 but add additional header to accommodate new interior active vents
New gas vents associated with landfill cap	Allow to vent to atmosphere	Allow to vent to atmosphere	Allow to vent to atmosphere	Tie-in to active venting system
O&M of gas collection system	Retain existing O&M practices	Modify to include routine inspections. Gas readings to be taken at all gas vents and monitoring wells. Improve maintenance program for all mechanical equipment	Same as alternative G-2	Same as alternative G-2

TABLE 3

Summary of Ground Water Remedial Alternatives

Components	Alternative W-1	Alternative W-2	Alternative W-3	Alternative W-4
Landfill capping and gas migration control per 6 NYCRR Part 360	Included	Included	Included	Included
Action at Southport Well	Reactivate and pump at 700 gpm max. to distribution without treatment after monitoring indicates the area of elevated VOC concentrations has dissipated	Reactivate, treat pumped water with an air stripper, pump treated water to distribution at 700 gpm max.	Reactivate, treat pumped water with an air stripper, pump treated water to distribution at 700 gpm max.	Reactivate, treat pumped water with an air stripper, pump treated water to distribution at 700 gpm max.
Action at zone of elevated VOC concentrations	None	None	Install extraction wells, pump at 330 gpm. Treat extracted water with a second air stripper and possibly a metals removal step. Discharge treated water to Hempstead Harbor, the local wastewater treatment plant or recharge to the Upper Glacial Aquifer.	Install extraction wells, pump at 330 gpm. Treat extracted water with an air stripper and a metals removal step. Reinject treated water back into the Upper Glacial Aquifer
Remediation of the Upper Glacial Aquifer	Not designed to actively attempt aquifer remediation. However, the alternative does impact a portion of the aquifer within the radius of influence of the Southport Well and thus it would provide some remediation of that portion of the aquifer	Not designed to actively attempt aquifer remediation. However, the alternative does impact a portion of the aquifer within the radius of influence of the Southport Well and thus it would provide some remediation of that portion of the aquifer	Actively attempts remediation by pumping at a rate sufficient to establish a cone of influence in the area of elevated VOC contamination to withdraw this "source" from the aquifer	Same as alternative W-3; however, the time for aquifer remediation is attempted to be accelerated through reinjection. Reinjection will increase the throughput of clean water across those portions of the aquifer with evidence of contamination
Monitoring program	Southport Well Only	Southport Well, air stripper emissions	Southport Well, Upper Glacial Aquifer, any discharges to Harbor, wastewater treatment plant or recharge to the aquifer, air stripper emissions	Southport Well, Upper Glacial Aquifer, discharge to reinjection wells, air stripper emissions

TABLE 4

COST ANALYSIS: CAPPING THE L-4 PARCEL UTILIZING A LOW PERMEABILITY SOIL (CLAY) SUBSEQUENT TO ADJUSTING EXISTING GRADE

tem No.	Description		Capital cost	Annual O&M cost
.	Additional fill to regrade to 3:1*	(400,000 cu yds of fill @ $12/cu yd)	$4,800,000	
.	Gas venting layer	(67,000 cu yds of sand @ $18/cu yd)	1,206,000	
.	Low Permeability layer	(100,000 cu yds of clay @ $40/cu yd)	4,000,000	
.	Barrier Protection layer	(134,000 cu. yds of fill @ $12/cu yd)	1,608,000	
.	Top soil	(34,000 cu yds @ $22/cu yd)	748,000	
.	Filter Fabric (2 layers)	(3,600,000 sq ft @ $0.10/sq ft)	360,000	
7.	Passive Gas Vents	(42 @ $4,000/ea)	168,000	
3.	Cap Maintenance (grass cutting, personnel)			$ 35,000
	Total		$12,890,000	$ 35,000/yr
	Engineering & Contingencies (35%)		4,512,000	
	Total Cost		$17,402,000	
	Present Worth Cost**		$17,940,000	

*The additional fill material used to adjust the existing grade to a 3:1 slope replaces the operational cover.

**Assumes a discount rate of 5 percent and a period of performance of 30 years. The present worth factor is 15.372.

TABLE 4 (cont'd)

COST ANALYSIS: SOURCE CONTROL REMEDIAL ALTERNATIVE G-2

Item No.	Description	Capital Cost	Annual O&M Cost
1.	Gas System Repair - remove existing gas headers - install temporary gas header - reinstall gas headers - install condensate drain traps - adjust gas well head vaults - safety equipment	$276,000	
2.	Blower Station Repair - supply new gas blowers - install new gas blowers - rework all pipe - remove existing blowers - safety equipment/monitoring	252,000	$32,000
3.	Monitoring of Vents, Wells, Blowers and Incinerator		108,000
4.	Technical/Administrative Review of Operations		31,000
5.	Vent Replacement Costs		29,000
6.	Incinerator Repair/Maintenance/Escrow		29,000
7.	Source Testing and Lab Analysis		5,000
8.	Gas Piping Repair and Maintenance		10,000
9.	Spare Parts Inventory		50,000
10.	Electricity		75,000
11.	Five Year Site Review (escrow)		8,000
	Total	$528,000	$377,000
	Engineering & Contingencies (35%)	185,000	
	Total Capital Cost	$713,000	
	Total Present Worth Cost*	$5,496,000	

TABLE 4 (cont'd)

COST ANALYSIS: SOURCE CONTROL REMEDIAL ALTERNATIVE G-2

*Assumes a discount rate of 5 percent and a period of performance of 30 years.

These costs do not reflect the costs for capping the landfill. Landfill capping costs are presented separately on the ensuing tables.

TABLE 4 (cont'd)

COST ANALYSIS: SOURCE CONTROL REMEDIAL ALTERNATIVE G-3

Item No.	Description	Capital Cost	Annual O&M Cost
1.	Gas System Repair (see G-2 for breakdown)	$276,000	
2.	Blower Station Repair (see G-2 for breakdown)	252,000	32,000
3.	Perimeter Gas Vents	222,000	
	- drilling - material (pipe, slotting, bentonite) - mobilization/demobilization - well head assembly - safety equipment/monitoring		
4.	Perimeter System Piping (above grade)	182,000	10,000
	- pipes, fittings, valves - drain sumps - safety equipment/monitoring		
5.	Horizontal Combustion Unit	285,000	18,000
	- equipment - foundations - mechanical/electrical installation		
6.	Monitoring of Vents, Wells, Blowers and Incinerator		110,000
7.	Technical/Administrative Review of Operations		17,000
8.	Site Safety Monitoring		42,000
9.	Vent Replacement Costs		36,000
10.	Incinerator Replacement Cost (escrow)		11,000
11.	Source Testing and Lab Analysis		5,000
12.	Spare Parts Inventory		50,000

TABLE 4 (cont'd)

COST ANALYSIS: SOURCE CONTROL REMEDIAL ALTERNATIVE G-3

Item No.	Description	Capital Cost	Annual O&M Cost
13.	Electricity		117,000
14.	Five Year Site Review (escrow)		8,000
	Total	$1,217,000	$456,000
	Engineering & Contingencies (35%)	426,000	
	Total Capital Cost	$1,643,000	
	Total Present Worth Cost*	$7,461,000	

*Assumes a discount rate of 5 percent and a period of performance of 30 years.

These costs do not reflect the costs for capping the landfill. Landfill capping costs are presented separately on the ensuing tables.

TABLE 4 (Cont'd)

COST ANALYSIS: SOURCE CONTROL REMEDIAL ALTERNATIVE G-4

Item No.	Description	Capital Cost	Annual O&M Cost
1.	Gas Blower Repair	$276,000	
2.	Blower Station Repair	252,000	32,000
3.	Perimeter Gas Vents	222,000	10,000
4.	Perimeter System Piping (above grade)	182,000	
5.	Horizontal Combustion Unit (see alternative G-3 for a breakdown of the above)	285,000	18,000
6.	Interior Gas Vents - installation - material - mobilization/demobilization - well head assemblies - safety equipment/monitoring	833,000	61,000
7.	Concrete Cistern Conversion - drilling costs - material - mobilization/demobilization - well head assemblies - safety equipment/monitoring	764,000	
8.	Interior Gas Header Piping (above grade) - pipe fittings - well head assemblies - condensate drain traps - safety equipment/monitoring	300,000	15,000
9.	Lateral Gas Header Piping (above grade) - pipes, fittings, valves - safety equipment/monitoring	140,000	
10.	Leachate Sump Conversion	59,000	
11.	Monitoring of Vents, Wells, Blowers and Incinerator		131,000
12.	Site Safety Monitoring		42,000

TABLE 4 (cont'd)

COST ANALYSIS: SOURCE CONTROL REMEDIAL ALTERNATIVE G-4

Item No.	Description	Capital Cost	Annual O&M Cost
13.	Technical/Administrative Review of Operations		21,000
14.	Incinerator Replacement Cost (escrow)		11,000
15.	Source Testing and Lab Analysis		5,000
16.	Spare Parts Inventory		50,000
17.	Electricity		158,000
18.	Five Year Site Review (escrow)		8,000
	Total	$3,313,000	$562,000
	Engineering & Contingencies (35%)	1,159,000	
	Total Capital Cost	$4,472,000	
	Total Present Worth Cost*	$11,754,000	

*Assumes a discount rate of 5 percent and a period of performance of 30 years.

These costs do not reflect the costs for capping the landfill. Landfill capping costs are presented separately on the ensuing tables.

TABLE 5

COST ANALYSIS: GROUND WATER REMEDIAL ALTERNATIVE W-2

Item No.	Description	Capital cost	Annual O&M cost
1.	Installation of landfill gas and ground water monitoring wells	$ 580,000	
2.	Air Stripper at Southport Well		$ 45,000
	- Pilot Study	20,000	
	- Earthwork (building and yard piping)	185,000	
	- Concrete	37,000	
	- Brick and Block, Structural Steel	35,000	
	- Thermal Protection (Insulation, Dampproofing)	7,000	
	- Doors and Finish Hardware, Painting	15,000	
	- Equipment (Blowers, pH adjustment, sod. hypo feed)	10,000	
	- Instrumentation	185,000	
	- Mechanical and Electrical Systems	511,000	
3.	Reactivation of Southport Well		27,000
4.	Implement Monitoring Program		
	- Sampling at Southport Air Stripper (Water Quality)		
	First Year		32,000
	Subsequent Years		14,000
	- Landfill Monitoring (gas and ground water)		240,000
	Summary		
	Capital Cost	$1,585,000	
	Engineering & Contingencies (35%)	555,000	
	Total Capital Cost	$2,140,000	
	First Year O&M Cost	$ 344,000	
	29 Year O&M Cost	$4,701,000	
	Total Present Worth O&M Cost	$5,045,000	
	Total Present Worth Cost*	$7,185,000	

*Assumes a discount rate of 5% and a period of performance of 30 years.

TABLE 5 (cont'd)

COST ANALYSIS: GROUND WATER REMEDIAL ALTERNATIVE W-3
(Recharge Basin)

Item No.	Description	Capital cost	Annual O&M cost
1.	Installation of landfill gas and ground water monitoring wells	$ 580,000	
2.	Air Stripper at Southport Well		$ 45,000
	- Pilot Study	20,000	
	- Earthwork (building and yard piping)	183,000	
	- Concrete	37,000	
	- Brick and Block, Structural Steel	32,000	
	- Thermal Protection (Insulation, Dampproofing)	7,000	
	- Doors and Finish Hardware, Painting	15,000	
	- Equipment (Blowers, pH adjustment, sod. hypo feed)	10,000	
	- Instrumentation	185,000	
	- Mechanical and Electrical Systems	506,000	
3.	Installation of Ground Water Extraction Wells	335,000	22,000
4.	Air Stripper at VOC Plume		25,000
	- Pilot Study	30,000	
	- Earthwork (building and yard piping)	275,000	
	- Concrete	42,000	
	- Brick and Block, Structural Steel	40,000	
	- Thermal Protection (Insulation, Dampproofing)	8,000	
	- Doors and Finish Hardware, Painting	21,000	
	- Equipment (Blowers, pH adjustment, sod. hypo feed)	10,000	
	- Instrumentation	277,000	
	- Mechanical and Electrical Systems	489,000	
5.	Metals Removal Process at VOC Plume Facility		287,000
	- Building expansion (reflected in item 4 above)		
	- Additional mechanical and electrical systems	400,000	
	- Instrumentation	102,000	
6.	Recharge Basins		
	- Earthwork	85,000	
	- Concrete	10,000	
	- Instrumentation & Electrical	5,000	
7.	Reactivation of Southport Well		27,000

TABLE 5 (cont'd)

COST ANALYSIS: GROUND WATER REMEDIAL ALTERNATIVE W-3 (Recharge Basin)

Item No.	Description	Capital cost	Annual O&M cost
8.	Implement Monitoring Program		
	- Sampling at Southport Air Stripper		
	First Year		32,000
	Subsequent Years		14,000
	- Sampling at VOC Plume Air Stripper		
	First Year		32,000
	Subsequent Years		14,000
	- Landfill Monitoring (gas and ground water)		240,000
	Summary		
	Capital Cost	$3,704,000	
	Engineering & Contingencies (35%)	1,296,000	
	Total Capital Cost	$5,000,000	
	First Year O&M Cost (Present Worth)	$ 710,000	
	29 Year O&M Cost (Present Worth)	$9,719,000	
	Total Present Worth O&M Cost	$10,429,000	
	Total Present Worth Cost*	$15,429,000	

*Assumes a discount rate of 5% and a period of performance of 30 years.

APPENDIX 3 - ADMINISTRATIVE RECORD INDEX

Document Number: WAS-003-0715 To 0716 Date: / /

Title: (Form letter regarding public access to the Draft Remedial Investigation Report for the Port Washington Landfill Superfund Site)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: none: Public Information Repository

Document Number: WAS-003-0742 To 0743 Date: / /

Title: Site Map: Existing Landfill Gas Monitoring Wells Port Washington Landfill

Type: GRAPHIC
Author: none: Camp Dresser & McKee (CDM)
Recipient: none: none

Document Number: WAS-003-0781 To 0781 Date: / /

Title: (Map of site showing well and sampling locations)

Type: GRAPHIC
Author: none: none
Recipient: none: none

Document Number: WAS-003-0951 To 0951 Date: / /

Title: (Attendance List)

Type: OTHER
Author: none: none
Recipient: none: none

Document Number: WAS-003-1003 To 1005 Date: / /

Title: Landfill Citizens Advisory Committee (Names and Addresses)

Type:
Author: none: none
Recipient: none: none

Document Number: WAS-003-1089 To 1110 Date: 08/02/82

Title: Documentation Records for Hazard Ranking System

Type: PLAN
Author: Hauptman, Melvin: US EPA
Recipient: none: none

Document Number: WAS-003-1061 To 1088 Date: 11/12/82

Title: Air Monitoring Program - Town of North Hempstead L-4 Landfill, Port Washington, NY - Report Executive Summary

Type: PLAN
Author: none: US EPA
Recipient: none: none

Document Number: WAS-001-0001 To 0177 Date: 12/01/82

Title: Field Investigations of Uncontrolled Hazardous Waste Sites - Port Washington Landfill Final Report

Type: PLAN
Author: Lipsky, David: Fred C Hart Associates
Recipient: none: US EPA

Document Number: WAS-001-1941 To 1989 Parent: WAS-001-1906 Date: 03/01/83

Title: Sampling and Analytical Protocol - Landfill Gas Monitoring at Port Washington Landfill

Type: PLAN
Author: none: SCS Engineers
Recipient: none: North Hempstead NY, Town of

Document Number: WAS-003-1059 To 1060 Parent: WAS-003-1057 Date: 09/22/83

Title: (Letter regarding an addition to the Draft Consent Order relating to the subsurface migration of pollutants from the site to public water supply wells)

Type: CORRESPONDENCE
Author: Schafer, Jacqueline E: US EPA
Recipient: Williams, Henry G: NY Dept of Environmental Conservation

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Document Number: WAS-003-1057 To 1058 Date: 11/16/83

Title: (Letter supporting 09/22/83 letter recommending additions be made to the consent order relating to subsurface migration of pollutants from site)

Type: CORRESPONDENCE
Author: Caputo, John A: Port Washington Water District
Recipient: Schafer, Jacqueline E: US EPA
Attached: WAS-003-1059

Document Number: WAS-003-1056 To 1056 Date: 11/28/83

Title: Landfill Meeting (attendance list)

Type: OTHER
Author: none: none
Recipient: none: none

Document Number: WAS-003-1054 To 1055 Date: 12/12/83

Title: (Letter complaining about the slow pace by which positive corrective measures are being implemented at the Town of North Hempstead Landfill)

Type: CORRESPONDENCE
Author: Youdelman, Robert A: Residents for a More Beautiful Port Washington
Recipient: Schafer, Jacqueline E: US EPA

Document Number: WAS-003-1053 To 1053 Date: 02/14/84

Title: (Letter urging EPA to enforce the appropriate action to get the Town of North Hempstead to agree to remediate the Port Washington Landfill)

Type: CORRESPONDENCE
Condition: MARGINALIA; MISSING ATTACHMENT
Author: Mosenchuck, Norman H: NY Dept of Environmental Conservation
Recipient: Librizzi, William J: US EPA

Document Number: WAS-001-0178 To 0476 Date: 06/01/84

Title: Remedial Action Master Plan

Type: PLAN
Author: Zimmerman, Gregory L: NUS Corporation
Recipient: none: US EPA
Attached: WAS-001-0477

Document Number: WAS-001-0477 To 0602 Parent: WAS-001-0178 Date: 07/25/84

Title: (Letter forwarding attached Responses to the Public Comments on the First Draft of the Remedial Action Master Plan)

Type: CORRESPONDENCE
Author: Zimmerman, Gregory L: NUS Corporation
Recipient: Raab, Robert: US EPA

Document Number: WAS-001-0603 To 0677 Date: 04/01/85

Title: Groundwater Modeling Study

Type: PLAN
Author: Zimmerman, Gregory L: NUS Corporation
Recipient: none: US EPA

Document Number: WAS-003-1051 To 1051 Date: 07/02/85

Title: (Letter requesting certain items pertaining to the preparation of the RI/FS Work Plan)

Type: CORRESPONDENCE
Author: Memoli, Michael: Camp Dresser & McKee (CDM)
Recipient: Stubing, Henry D: North Hempstead NY, Town of

Document Number: WAS-003-1052 To 1052 Date: 07/02/85

Title: Landfill CAC Meeting (attendance list)

Type: OTHER
Author: none: none
Recipient: none: none

Document Number: WAS-003-1049 To 1050 Date: 07/03/85

Title: (Letter forwarding attached list of villages and special districts needed for the Community Information program)

Type: CORRESPONDENCE
Author: Cunningham, Bert J: North Hempstead NY, Town of
Recipient: Hauptman, Melvin: US EPA

Document Number: WAS-003-1048 To 1048 Date: 08/23/85

Title: Landfill CAC Meeting (attendance list)

Type: OTHER
Author: none: none
Recipient: none: none

Document Number: WAS-003-1047 To 1047 Date: 08/28/85

Title: (Letter regarding comments on Port Washington Draft Work Plan)

Type: CORRESPONDENCE
Author: Foltin, William Robert: NY Dept of Environmental Conservation
Recipient: Als, Edward G: US EPA

Document Number: WAS-003-1046 To 1046 Date: 08/29/85

Title: (Letter confirming telephone conversation concerning meetings with the Town's engineers)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Delaney, John F: North Hempstead NY, Town of

Document Number: WAS-003-1042 To 1044 Date: 09/19/85

Title: (Memo summarizing 09/12/85 Port Washington Groundwater Modeling Meeting)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: none: US EPA

Document Number: WAS-003-1041 To 1041 Date: 09/23/85

Title: Landfill CAC Meeting (attendance list)

Type: OTHER
Author: none: none
Recipient: none: none

Document Number: WAS-003-1038 To 1040 Date: 09/25/85

Title: (Memo summarizing 09/10/85 Port Washington Landfill Gas Meeting)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: McCabe, William: US EPA

Document Number: WAS-003-1035 To 1037 Parent: WAS-003-1033 Date: 10/07/85

Title: (Letter regarding information requested at 10/01/85 meeting between CDM and Geraghty & Miller)

Type: CORRESPONDENCE
Author: Hauptman, Melvin: US EPA
Recipient: Delaney, John F: North Hempstead NY, Town of

Document Number: WAS-001-0678 To 0814 Parent: WAS-001-0680 Date: 10/25/85

Title: Remedial Investigation/Feasibility Study Work Plan Volume 1

Type: PLAN
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: none: US EPA

Document Number: WAS-001-0680 To 0681 Date: 10/25/85

Title: (Letter submitting RI/FS Work Plan)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Alvi, M Shaheer: US EPA
Attached: WAS-001-0678 WAS-001-0815 WAS-001-0870

Document Number: WAS-001-0815 To 0869 Parent: WAS-001-0680 Date: 10/29/85

Title: Responses to Questions Raised in Connection with Draft Work Plan for Remedial Investigation/Feasibility Study

Type: OTHER
Author: none: none
Recipient: none: none

Document Number: WAS-003-1033 To 1034 Date: 10/29/85

Title: (Letter notifying that EPA is planning to conduct RI/FS activities at the Port Washington Landfill site)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Librizzi, William J: US EPA
Recipient: Kiernan, John B: North Hempstead NY, Town of
Attached: WAS-003-1035

Document Number: WAS-003-1016 To 1032 Date: 10/30/85

Title: (Letter forwarding attached Evaluation of Applicability of Town of North Hempstead Modeling Efforts to RI/FS Requirements)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Als, Edward G: US EPA

Document Number: WAS-003-1013 To 1015 Date: 11/01/85

Title: (Letter regarding Port Washington Municipal Landfill - Assessment of Comprehensive Landfill Gas Data and Information)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Als, Edward G: US EPA

Document Number: WAS-003-1012 To 1012 Date: 11/21/85

Title: Landfill CAC Meeting (attendance list)

Type: OTHER
Author: none: none
Recipient: none: none

Document Number: WAS-003-1010 To 1011 Parent: WAS-003-1006 Date: 12/04/85

Title: (Letter requesting state funds to pre-finance a portion of the RI/FS, so that remedial studies can begin)

Type: CORRESPONDENCE
Author: Daggett, Christopher J: US EPA
Recipient: Williams, Henry G: NY Dept of Environmental Conservation

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Document Number: WAS-003-1008 To 1009 Date: 12/06/85

Title: (Letter regarding extension of time to review the RI/FS Work Plan, and the expectation that EPA will proceed with the work as outlined therein)

Type: CORRESPONDENCE
Author: Dolan, Robert F: North Hempstead NY, Town of
Recipient: Hauptman, Melvin: US EPA

Document Number: WAS-003-1007 To 1007 Date: 12/18/85

Title: Landfill CAC Meeting (attendance list)

Type: OTHER
Author: none: none
Recipient: none: none

Document Number: WAS-003-1006 To 1006 Date: 01/09/86

Title: (Letter in response to 12/04/85 letter regarding pre-financing mechanism for the remedial studies at Port Washington Landfill)

Type: CORRESPONDENCE
Author: Williams, Henry G: NY Dept of Environmental Conservation
Recipient: Daggett, Christopher J: US EPA
Attached: WAS-003-1010

Document Number: WAS-003-0972 To 0972 Date: 02/26/86

Title: Landfill CAC Meeting (attendance list)

Type: OTHER
Author: none: none
Recipient: none: none

Document Number: WAS-003-0971 To 0971 Parent: WAS-003-0970 Date: 02/28/86

Title: (Letter requesting prompt action in approving Superfund reauthorization to prevent further delays in the hazardous waste cleanup process)

Type: CORRESPONDENCE
Author: Mrazek, Robert J: US Congress
Recipient: Dingell, John D: US Congress

Document Number: WAS-003-0970 To 0970 Date: 03/06/86

Title: (Letter regarding Superfund toxic-waste cleanup reauthorization)

Type: CORRESPONDENCE
Author: Mrazek, Robert J: US Congress
Recipient: Rubel, Fred: US EPA
Attached: WAS-003-0971

Document Number: WAS-003-0969 To 0969 Date: 06/17/86

Title: (Letter regarding the development of landfill gas monitoring for the Port Washington site)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Als, Edward G: US EPA

Document Number: WAS-003-0968 To 0968 Parent: WAS-003-0954 Date: 07/10/86

Title: (Letter objecting to the fact that the Town of North Hempstead refused a CAC request to attend the meeting with EPA)

Type: CORRESPONDENCE
Condition: MARGINALIA
Author: VanDusen, Patricia: Citizens' Advisory Committee
Recipient: Daggett, Christopher J: US EPA

Document Number: WAS-003-0967 To 0967 Date: 07/10/86

Title: Attendance - Meeting at Town Hall, EPA and Town Representatives

Type: OTHER
Author: none: none
Recipient: none: none

Document Number: WAS-003-0959 To 0966 Date: 07/14/86

Title: (Port Washington Landfill Site Community Relations Implementation Planning Memorandum)

Type: CORRESPONDENCE
Author: Pohl, Rachel L: ICF Incorporated
Recipient: Johnson, Lillian D: US EPA

Document Number: WAS-003-0954 To 0958 Date: 07/15/86

Title: (Letter regarding working relationship among EPA staff, Town officials and the Citizens' Advisory Committee)

Type: CORRESPONDENCE
Author: Kiernan, John B: North Hempstead NY, Town of
Recipient: Daggett, Christopher J: US EPA
Attached: WAS-003-0968

Document Number: WAS-003-0973 To 1002 Date: 08/21/86

Title: Memorandum of Understanding between the State of New York and the US Environmental Protection Agency for Remedial Planning Activities related to the Port Washington Landfill Site

Type: LEGAL DOCUMENT
Author: Nosenchuck, Norman H: NY Dept of Environmental Conservation
Recipient: Luftig, Stephen D: US EPA

Document Number: WAS-003-0952 To 0953 Date: 08/28/86

Title: (Memo regarding action items that are being resolved to progress with the RI)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Als, Edward G: US EPA

Document Number: WAS-003-0948 To 0950 Date: 10/29/86

Title: (Letter posing questions relating to existing well construction used to measure volatile organic contamination in the site vicinity)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: Delaney, John F: North Hempstead NY, Town of

Document Number: WAS-003-0946 To 0947 Date: 11/13/86

Title: (Letter regarding deletion of the Southport well pump test from the Final Work Plan, as directed by EPA)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Als, Edward G: US EPA

Document Number: WAS-001-0870 To 1012 Parent: WAS-001-0680 Date: 11/14/86

Title: Remedial Investigation/Feasibility Study Work Plan Volume 1

Type: PLAN
Condition: MARGINALIA
Author: none: Camp Dresser & McKee (CDM)
Recipient: none: US EPA

Document Number: WAS-001-1013 To 1253 Parent: WAS-001-1015 Date: 11/14/86

Title: Remedial Investigation/Feasibility Study Final Project Operations Plan - Volume I

Type: PLAN
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: none: US EPA

Document Number: WAS-001-1254 To 1735 Parent: WAS-001-1015 Date: 11/14/86

Title: Preliminary Draft Project Operations Plan - Volume II Appendices

Type: PLAN
Author: none: Camp Dresser & McKee (CDM)
Recipient: none: US EPA

Document Number: WAS-003-0744 To 0752 Date: 11/14/86

Title: Volatile Organic Chemicals Acquired Monitoring and POP Sampling Protocols

Type: PLAN
Author: none: none
Recipient: none: none

Document Number: WAS-001-1015 To 1016 Date: 11/19/86

Title: (Letter submitting RI/FS Final Project Operations Plan)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Alvi, M Shaheer: US EPA
Attached: WAS-001-1013 WAS-001-1254

Document Number: WAS-003-0944 To 0945 Date: 11/28/86

Title: (Memo regarding Port Washington Landfill Quality Assurance Program)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: Finazzi, Barbara: US EPA

Document Number: WAS-003-0942 To 0942 Parent: WAS-003-0941 Date: 12/04/86

Title: (Letter regarding Port Washington RI/FS, expressing concern about the possible pollution of Hempstead Harbor)

Type: CORRESPONDENCE
Author: Mrazek, Robert J: US Congress
Recipient: Daggett, Christopher J: US EPA

Document Number: WAS-003-0943 To 0943 Date: 12/16/86

Title: (Letter regarding notification of the commencement of field work by EPA at the Port Washington L-4 Superfund site)

Type: CORRESPONDENCE
Author: Pavlou, George: US EPA
Recipient: Nosenchuck, Norman H: NY Dept of Environmental Conservation

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Document Number: WAS-003-0941 To 0941 Date: 12/30/86

Title: (Letter in response to concern regarding the effect of the Port Washington Landfill Superfund site on the water quality of Hempstead Harbor)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Daggett, Christopher J: US EPA
Recipient: Mrazek, Robert J: US Congress
Attached: WAS-003-0942

Document Number: WAS-001-1938 To 1939 Parent: WAS-001-1906 Date: 01/29/87

Title: (Letter regarding groundwater sampling and monitoring procedures)

Type: CORRESPONDENCE
Author: MacCallum, Douglas R: Geraghty & Miller
Recipient: Stubing, Henry D: North Hempstead NY, Town of

Document Number: WAS-003-0916 To 0917 Parent: WAS-003-0915 Date: 01/29/87

Title: (Letter regarding requested information concerning groundwater monitoring procedures at the North Hempstead Landfill)

Type: CORRESPONDENCE
Author: MacCallum, Douglas R: Geraghty & Miller
Recipient: Stubing, Henry D: North Hempstead NY, Town of

Document Number: WAS-003-0918 To 0939 Parent: WAS-003-0915 Date: 01/29/87

Title: (Letter and attached report in response to 10/29/86 letter regarding Landfill gas monitoring program)

Type: CORRESPONDENCE
Author: Conrad, E T: SCS Engineers
Recipient: Stubing, Henry D: North Hempstead NY, Town of

Document Number: WAS-003-0940 To 0940 Date: 02/04/87

Title: (Form letter announcing drilling of sampling wells relating to the investigation of soil, air, and groundwater in the vicinity of the Port Washington Landfill)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: none: resident

Document Number: WAS-003-0915 To 0915 Date: 02/09/87

Title: (Letter forwarding information requested in 10/29/86 letter)

Type: CORRESPONDENCE
Author: Delaney, John F: North Hempstead NY, Town of
Recipient: Als, Edward G: US EPA
Attached: WAS-003-0916 WAS-003-0918

Document Number: WAS-003-0913 To 0914 Date: 02/23/87

Title: (Memo regarding External Well Casing Decision for well no. 110)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: none: US EPA

Document Number: WAS-003-0912 To 0912 Date: 02/25/87

Title: Landfill CAC Meeting Attendance List

Type: OTHER
Author: none: none
Recipient: none: none

Document Number: WAS-003-0903 To 0904 Date: 04/01/87

Title: (Superfund Update reviewing activities of the Port Washington Landfill site and announcing 05/07/87 public workshop)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: none: none

Document Number: WAS-003-0905 To 0910 Date: 04/10/87

Title: (Map and tables relating to samples taken from area affected by spill at site)

Type: GRAPHIC
Author: none: Camp Dresser & McKee (CDM)
Recipient: none: none

Document Number: WAS-003-0902 To 0902 Date: 04/30/87

Title: (Form letter announcing the installation of a landfill gas monitoring well relating to the investigation of soil, air and groundwater in the vicinity of the Port Washington Landfill)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: none: resident

Document Number: WAS-003-0900 To 0901 Date: 05/06/87

Title: (Letter regarding the rationale for the installation of groundwater monitoring well 101)

Type: CORRESPONDENCE
Author: Del, Emil F: Camp Dresser & McKee (CDM)
Recipient: Als, Edward G: US EPA

Document Number: WAS-003-0911 To 0911 Date: 05/09/87

Title: (Form letter announcing installation of monitoring wells relating to the investigation of the Port Washington Landfill)

Type: CORRESPONDENCE
Author: McCabe, William: US EPA
Recipient: none: North Hempstead Country Club

Document Number: WAS-001-1749 To 1985 Parent: WAS-001-1751 Date: 06/09/87

Title: Updated Remedial Investigation/Feasibility Study Work Plan Volume 1

Type: PLAN
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: none: US EPA

Document Number: WAS-001-1751 To 1752 Date: 06/25/87

Title: (Letter forwarding Updated RI/FS Work Plan)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Alvi, M Shaheer: US EPA
Attached: WAS-001-1749

Document Number: WAS-003-0899 To 0899 Date: 06/25/87

Title: (Letter regarding changes in the Work Plan for Port Washington Landfill Site)

Type: CORRESPONDENCE
Condition: INCOMPLETE
Author: none: Camp Dresser & McKee (CDM)
Recipient: Alvi, M Shaheer: US EPA

Document Number: WAS-003-0898 To 0898 Date: 07/21/87

Title: (Memo regarding Double Casing Decision for BWM Well 109)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: none: US EPA

Document Number: WAS-003-0896 To 0897 Date: 08/11/87

Title: (Letter confirming prior telephone conversation regarding findings of drummed waste materials on Town property)

Type: CORRESPONDENCE
Author: Dolan, Robert F: North Hempstead NY, Town of
Recipient: Als, Edward G: US EPA

Document Number: WAS-003-0895 To 0895 Date: 08/13/87

Title: (Form letter notifying of the scheduled installation of a landfill gas monitoring as well as part of the investigation of soil air, and groundwater in the vicinity of the site)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: none: resident

Document Number: WAS-003-0891 To 0894 Date: 08/19/87

Title: (Letter explaining the rationale for the location of landfill gas monitoring wells G201-204)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Als, Edward G: US EPA

Document Number: WAS-003-0890 To 0890 Date: 08/27/87

Title: Attendance List

Type: OTHER
Author: none: none
Recipient: none: none

Document Number: WAS-003-0889 To 0889 Date: 09/17/87

Title: (Letter forwarding Draft POP Addendum I regarding protocols and procedures for obtaining samples from existing water District wells for review and comment)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Als, Edward G: US EPA
Recipient: Delaney, John F: North Hempstead NY, Town of

Document Number: WAS-003-0888 To 0888 Date: 09/18/87

Title: (Letter regarding the planned transportation of excavated materials from the L-5/new cell excavation area at the Landfill)

Type: CORRESPONDENCE
Author: Lieber, Thomas K: US EPA
Recipient: Dolan, Robert F: North Hempstead NY, Town of

Document Number: WAS-003-0885 To 0885 Parent: WAS-003-0883 Date: 09/28/87

Title: (Letter forwarding POP Draft Addendum regarding sampling protocols and related quality assurance objectives for groundwater monitoring wells and landfill gas wells in the vicinity of the site)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Als, Edward G: US EPA
Recipient: Coakley, William: US EPA

Document Number: WAS-003-0887 To 0887 Date: 09/29/87

Title: (Attendance List)

Type: OTHER
Author: none: none
Recipient: none: none

Document Number: WAS-003-0865 To 0866 Parent: WAS-003-0863 Date: 10/06/87

Title: (Letter regarding comments on CDM POP - Addendum I)

Type: CORRESPONDENCE
Author: Barber, Andrew J: Geraghty & Miller
Recipient: D'Antonio, William J: North Hempstead NY, Town of

Document Number: WAS-003-0867 To 0881 Parent: WAS-003-0863 Date: 10/06/87

Title: (Letter regarding comments on the draft Project Operations Plan - Addendum I)

Type: CORRESPONDENCE
Author: Conrad, E T: SCS Engineers
Recipient: Stubing, Henry D: North Hempstead NY, Town of

Document Number: WAS-003-0858 To 0859 Parent: WAS-003-0857 Date: 10/19/87

Title: (Letter posing questions regarding the discovery of a large number of containers of toxic petroleum-based products at the L-5 landfill area operated by the Town of North Hempstead)

Type: CORRESPONDENCE
Author: Mrazek, Robert J: US Congress
Recipient: Daggett, Christopher J: US EPA

Document Number: WAS-001-1736 To 1748 Parent: WAS-001-1738 Date: 10/20/87

Title: Project Operations Plan Addendum 4 - Analytical Protocol for Landfill Gas Collected in Summa Canisters

Type: PLAN
Author: none: Camp Dresser & McKee (CDM)
Recipient: none: US EPA

Document Number: WAS-003-0863 To 0864 Date: 10/22/87

Title: (Letter forwarding written comments on the Project Operations Plan Addendum I and information from the Town's files relating to LFG wells)

Type: CORRESPONDENCE
Author: Delaney, John F: North Hempstead NY, Town of
Recipient: Als, Edward G: US EPA
Attached: WAS-003-0865 WAS-003-0867 WAS-003-0882

Document Number: WAS-001-1738 To 1738 Date: 10/23/87

Title: (Letter forwarding Project Operations Plan Addendum 4)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Als, Edward G: US EPA
Attached: WAS-001-1736

Document Number: WAS-003-0882 To 0882 Parent: WAS-003-0863 Date: 11/03/87

Title: (Letter requesting additional information on Port Washington Water District wells)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Casey, Thomas J: Henderson & Casey

Document Number: WAS-003-0883 To 0883 Date: 11/03/87

Title: (Letter requesting additional information on Port Washington Water District wells)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Thader, Richard: Hydrogroup
Attached: WAS-003-0884 WAS-003-0885

Document Number: WAS-003-0884 To 0884 Parent: WAS-003-0883 Date: 11/03/87

Title: (Letter requesting additional information on Port Washington Water District wells)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Ham, William: Port Washington Water District

Document Number: WAS-003-0860 To 0862 Date: 11/04/87

Title: (Letter forwarding attached maps showing the location of pressure probe wells at the landfill site)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Als, Edward G: US EPA

Document Number: WAS-003-0857 To 0857 Date: 11/16/87

Title: (Letter in response to 10/19/87 letter regarding drums discovered at the new field area of the Port Washington Landfill, and forwarding a partial response from the Town of North Hempstead)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Daggett, Christopher J: US EPA
Recipient: Mrazek, Robert J: US Congress
Attached: WAS-003-0858

Document Number: WAS-003-0856 To 0856 Parent: WAS-003-0851 Date: 11/23/87

Title: (Letter requesting Informational Meeting with Colonial Sand & Gravel to obtain information on wells and sand washing ponds near site)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Als, Edward G: US EPA

Document Number: WAS-001-1906 To 2004 Date: 11/30/87

Title: Project Operations Plan - Addendum I, Revision 2

Type: PLAN
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: none: US EPA
Attached: WAS-001-1938 WAS-001-1941

Document Number: WAS-003-0853 To 0854 Parent: WAS-003-0851 Date: 12/10/87

Title: (Memo regarding Pressure Well Installations Port at Washington Landfill Site)

Type: CORRESPONDENCE
Author: Vogt, W Gregory: SCS Engineers
Recipient: D'Antonio, William J: North Hempstead NY, Town of

Document Number: WAS-003-0855 To 0855 Parent: WAS-003-0851 Date: 12/12/87

Title: (Letter forwarding the EPA-approved Project Operations Plan Addendum, which specifically addresses the sampling protocols that EPA will follow while sampling wells)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Als, Edward G: US EPA
Recipient: Delaney, John F: North Hempstead NY, Town of

Document Number: WAS-003-0851 To 0852 Date: 12/16/87

Title: (Letter forwarding memo regarding placing of pressure probes)

Type: CORRESPONDENCE
Author: Delaney, John F: North Hempstead NY, Town of
Recipient: Als, Edward G: US EPA
Attached: WAS-003-0853 WAS-003-0855 WAS-003-0856

Document Number: WAS-003-0835 To 0850 Date: 02/03/88

Title: (Letter and attached graphics regarding calculations of depth of pressure probe wells at Port Washington landfill site)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Als, Edward G: US EPA

Document Number: WAS-003-0833 To 0834 Date: 02/04/88

Title: (Letter requesting information relating to EPA's ongoing remedial investigation and feasibility study of the Port Washington L-4 landfill)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: Delaney, John F: North Hempstead NY, Town of

Document Number: WAS-003-0830 To 0832 Date: 02/08/88

Title: (Letter regarding determination of optimum drilling depths for the five boreholes that EPA intends to drill into the L-4 landfill)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: Delaney, John F: North Hempstead NY, Town of

Document Number: WAS-003-0827 To 0829 Date: 02/16/88

Title: (Letter regarding pump test in the area of the Port Washington landfill and initiation of the pressure probe drilling program)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: Delaney, John F: North Hempstead NY, Town of

Document Number: WAS-003-0822 To 0826 Date: 02/17/88

Title: (Letter supplementing 11/16/87 response to 10/19/87 letter regarding drums discovered at the new field area of the site)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Daggett, Christopher J: US EPA
Recipient: Mrazek, Robert J: US Congress

Document Number: WAS-003-0818 To 0819 Date: 03/01/88

Title: (Letter requesting that a NYSDOH representative attend a health risk assessment workshop in 05/88)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: Tramontano, Ronald: NY Dept of Health

Document Number: WAS-003-0820 To 0821 Date: 03/01/88

Title: (Letter requesting that a representative from the County Health Department attend a health risk assessment workshop in 05/88)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: Dowling, John J: Nassau NY, County of

Document Number: WAS-002-0655 To 0729 Parent: WAS-002-0657 Date: 03/11/88

Title: Remedial Investigation Preliminary Field Data Volume I

Type: DATA
Author: none: Camp Dresser & McKee (CDM)
Recipient: none: US EPA

Document Number: WAS-002-0657 To 0657 Date: 03/11/88

Title: (Letter submitting RI Preliminary Field Data Volume I)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Alvi, M Shaheer: US EPA
Attached: WAS-002-0655

Document Number: WAS-003-0817 To 0817 Date: 03/25/88

Title: (Letter requesting that NYSDEC indicate what it believes are state ARARs for the Port Washington Landfill)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: Foltin, William Robert: NY Dept of Environmental Conservation

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Document Number: WAS-003-0813 To 0816 Date: 03/30/88

Title: (Letter forwarding attached index for Volume I and II of New York State ARARs)

Type: CORRESPONDENCE
Author: Rodabaugh, Scott: NY Dept of Environmental Conservation
Recipient: Als, Edward G: US EPA

Document Number: WAS-003-0811 To 0812 Date: 05/01/88

Title: (Superfund Update regarding activities at the Port Washington Landfill site and announcing 06/01/88 CAC meeting)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: none: none

Document Number: WAS-003-0808 To 0809 Date: 06/01/88

Title: (Letter requesting a meeting with the Town of North Hempstead and its consultants, and a tour of the L-4 and L-5 landfill areas)

Type: CORRESPONDENCE
Condition: DRAFT
Author: none: Citizens' Advisory Committee
Recipient: Kiernan, John B: North Hempstead NY, Town of

Document Number: WAS-003-0810 To 0810 Date: 06/01/88

Title: EPA Superfund Port Washington CAC Meeting (attendance list)

Type: OTHER
Author: none: none
Recipient: none: none

Document Number: WAS-003-0807 To 0807 Date: 06/06/88

Title: (Letter to Congressional staffer requesting help in arranging a meeting with Chris Daggett of EPA and Congressman Mrazek)

Type: CORRESPONDENCE
Author: Markowski, Ellen: Residents for a More Beautiful Port Washington
Recipient: Norman, David: US Congress

Document Number: WAS-003-0003 To 0004 Date: 06/09/88

Title: (Letter regarding laboratory results of EPA first round of sampling performed under the Remedial Investigation of the Port Washington Landfill L-4)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Forquer, Betty: Port Washington Water District
Recipient: Als, Edward G: US EPA

Document Number: WAS-003-0005 To 0006 Date: 06/21/88

Title: (Letter regarding ambient air testing at the landfill downwind of the site, and in the surrounding area)

Type: CORRESPONDENCE
Author: Tietz, Larry D: Port Washington Union Free School District
Recipient: Als, Edward G: US EPA

Document Number: WAS-003-0002 To 0002 Date: 07/07/88

Title: (Memo regarding Health Consultation, Port Washington Landfill)

Type: CORRESPONDENCE
Author: Johnson, Denise: Agency for Toxic Substances & Disease Registry (ATSDR)
Recipient: Mullen, Brooks: US EPA

Document Number: WAS-002-0758 To 0758 Parent: WAS-002-0730 Date: 07/11/88

Title: (Letter approving Health and Safety Plan)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Prosser, Richard: Mandeville & Associates

Document Number: WAS-003-0800 To 0801 Date: 07/13/88

Title: (Memo regarding request for landfill gas analytical services from ERT)

Type: CORRESPONDENCE
Author: Pavlou, George: US EPA
Recipient: LaFomara, Joseph: US EPA

Document Number: WAS-002-0730 To 0758 Date: 07/14/88

Title: Project Operations Plan Addendum 6 - Landfill Gas Collection and Venting System Assessment

Type: PLAN
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: none: US EPA
Attached: WAS-002-0758

Document Number: WAS-003-0799 To 0799 Date: 07/19/88

Title: Sign-In Sheet

Type: OTHER
Author: none: none
Recipient: none: none

Document Number: WAS-003-0797 To 0797 Date: 07/21/88

Title: (Letter regarding delay in obtaining inorganic data from the 04/88 groundwater sampling campaign)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Alvi, M Shaheer: US EPA

Document Number: WAS-003-0792 To 0796 Date: 07/26/88

Title: (Letter regarding 07/21/88 meeting concerning vent system assessment status - options for future activities)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Alvi, M Shaheer: US EPA

Document Number: WAS-003-0785 To 0788 Date: 07/27/88

Title: (Letter forwarding attached data sheets relating to off-site migration of landfill gases)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Als, Edward G: US EPA

Document Number: WAS-003-0789 To 0789 Date: 07/27/88

Title: Attendance List - EPA/Port Washington CAC Meeting

Type: OTHER
Author: none: none
Recipient: none: none

Document Number: WAS-003-0790 To 0791 Date: 07/27/88

Title: (Letter documenting attempts to secure copies of the blower fog book(s) from the Town of North Hempstead)

Type: CORRESPONDENCE
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Alvi, M Shaheer: US EPA

Document Number: WAS-003-0782 To 0784 Date: 08/02/88

Title: (Memo regarding summary of 07/19/88 meeting at Congressman Mrazek's office in Huntington, New York)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: Pavlou, George: US EPA

Document Number: WAS-003-0758 To 0758 Date: 08/05/88

Title: (Letter requesting a schematic of the water distribution system for Port Washington, and the criteria used to start particular pumps into operation)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Dul, Emil F: Camp Dresser & McKee (CDM)
Recipient: Forquer, Betty: Port Washington Water District

Document Number: WAS-003-0753 To 0757 Date: 08/16/88

Title: (104e Information Request Letter)

Type: CORRESPONDENCE
Author: Luftig, Stephen D: US EPA
Recipient: Delaney, John F: North Hempstead NY, Town of

Document Number: WAS-003-0775 To 0777 Parent: WAS-003-0774 Date: 08/16/88

Title: (Letter regarding Depth to Groundwater in Active Wells - Evaluation of the LFG Extraction System - RI/FS at the Port Washington L-4 Landfill)

Type: CORRESPONDENCE
Author: Vogt, W Gregory: SCS Engineers
Recipient: D'Antonio, William J: North Hempstead NY, Town of

Document Number: WAS-003-0779 To 0780 Date: 08/17/88

Title: (Memo regarding special service request for the Port Washington LF Superfund Site)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Als, Edward G: US EPA
Recipient: Pritchard, Thomas H: US EPA

Document Number: WAS-003-0778 To 0778 Date: 08/18/88

Title: (Letter forwarding plans and specifications for Town of North Hempstead's phase 1 rehabilitation and enhancement of the active gas venting system on the Port Washington LF)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Als, Edward G: US EPA
Recipient: Bocherer, Robert: NY Dept of Environmental Conservation

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Document Number: WAS-003-0774 To 0774 Date: 08/25/88

Title: (Letter forwarding information regarding measurements of groundwater depths in various wells)

Type: CORRESPONDENCE
Author: Delaney, John F: North Hempstead NY, Town of
Recipient: Als, Edward G: US EPA
Attached: WAS-003-0775

Document Number: WAS-003-0771 To 0773 Date: 09/06/88

Title: (Letter in response to 08/16/88 letter 104e)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Delaney, John F: North Hempstead NY, Town of
Recipient: Als, Edward G: US EPA

Document Number: WAS-003-0770 To 0770 Date: 09/08/88

Title: (Announcement regarding 09/14/88 Health Risk Assessment Workshop)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: none: none

Document Number: WAS-003-0768 To 0768 Date: 09/14/88

Title: Attendance List - EPA Risk Assessment Workshop

Type: OTHER
Author: none: none
Recipient: none: none

Document Number: WAS-003-0769 To 0769 Date: 09/14/88

Title: (Announcement regarding air samples to be taken in the vicinity of the Port Washington Landfill)

Type: CORRESPONDENCE
Author: Funcia, Isabel: US EPA
Recipient: none: none

Document Number: WAS-003-0763 To 0763 Date: 09/16/88

Title: (Letter forwarding memo detailing the scope of services to be performed by EPA's Environment Response Team at the Port Washington Landfill Superfund Site)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Als, Edward G: US EPA
Recipient: Delaney, John F: North Hempstead NY, Town of

Document Number: WAS-003-0764 To 0767 Date: 10/06/88

Title: (Memo regarding TAGA Monitoring at Port Washington)

Type: CORRESPONDENCE
Author: Nickunas, David B: Weston Environmental Consultants Designers
Recipient: Als, Edward G: US EPA

Document Number: WAS-003-0762 To 0762 Date: 11/07/88

Title: (Letter confirming prior discussions regarding side slope flux measurements)

Type: CORRESPONDENCE
Author: Hyde, Robert A: Camp Dresser & McKee (CDM)
Recipient: Alvi, M Shaheer: US EPA

Document Number: WAS-003-0759 To 0761 Date: 11/09/88

Title: (Letter providing update on the activities of the USEPA at site based on the decisions reached during the 07/19/88 meeting at the Huntington District Office)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Muszynski, William J: US EPA
Recipient: Mrazek, Robert J: US Congress

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Document Number: WAS-002-0759 To 0896 Date: 12/01/88

Title: TAGA Analysis of Ambient Air in the Vicinity of the Landfill at Port Washington, NY - Final Report

Type: PLAN
Author: Nickunas, David B: Roy F Weston Inc
Recipient: Pritchett, Thomas H: US EPA

Document Number: WAS-002-0897 To 0973 Date: 12/01/88

Title: Port Washington Summa Canister Final Report

Type: PLAN
Author: Nickunas, David B: Roy F Weston Inc
Recipient: Pritchett, Thomas H: US EPA
Attached: WAS-002-0974 WAS-002-1249 WAS-002-1491 WAS-002-1539 WAS-002-1752

Document Number: WAS-002-0974 To 1248 Parent: WAS-002-0897 Date: 12/01/88

Title: Port Washington Summa Canister Report Appendices B-D

Type: DATA
Author: none: none
Recipient: none: none

Document Number: WAS-002-1249 To 1490 Parent: WAS-002-0897 Date: 12/01/88

Title: Port Washington Summa Canister Report Appendix A

Type: DATA
Author: none: none
Recipient: none: none

Document Number: WAS-003-0729 To 0741 Parent: WAS-003-0725 Date: 12/01/88

Title: A Final Summary Report on the Soil Vapor Survey - Port Washington, New York

Type: PLAN
Author: Compton, Harry R: US EPA
Recipient: none: none

Document Number: WAS-003-0727 To 0728 Parent: WAS-003-0725 Date: 12/05/88

Title: (Letter forwarding USEPA's final report on the soil gas survey performed on 09/21/88)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: Candela, Tony: NY Dept of Environmental Conservation

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Document Number: WAS-003-0725 To 0726 Date: 12/14/88

Title: (Letter forwarding USEPA's final report on the soil gas survey performed on 09/21/88 in the Seaview Industrial Park)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: Schmergel, F William: Schmergel Enterprises Corporation
Attached: WAS-003-0727 WAS-003-0729

Document Number: WAS-003-0724 To 0724 Date: 12/16/88

Title: (Letter requesting additional information in connection with USEPA's ongoing investigation of the Port Washington Landfill L-4 Superfund site)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: Delaney, John F: North Hempstead NY, Town of

Document Number: WAS-003-0722 To 0723 Date: 01/03/89

Title: (Letter regarding topics discussed at 12/08/88 meeting between NYSDEC/EPA and Town of North Hempstead representatives)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: Candela, Tony: NY Dept of Environmental Conservation

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Document Number: WAS-003-0721 To 0721 Date: 01/10/89

Title: (Letter forwarding materials requested in 12/16/88 letter)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Delaney, John F: North Hempstead NY, Town of
Recipient: Als, Edward G: US EPA

Document Number: WAS-003-0720 To 0720 Date: 01/17/89

Title: CAC Meeting Attendance (list)

Type: OTHER
Author: none: none
Recipient: none: none

Document Number: WAS-003-0719 To 0719 Date: 02/03/89

Title: (Form letter announcing 02/21/89 Citizens' Advisory Committee Meeting)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: none: none

Document Number: WAS-001-2005 To 2269 Date: 03/01/89

Title: Draft Remedial Investigation Report Appendices - Volume I

Type: PLAN
Condition: DRAFT
Author: none: Camp Dresser & McKee (CDM)
Recipient: none: US EPA
Attached: WAS-001-2270 WAS-002-0001 WAS-002-0298 WAS-002-1852 WAS-003-0001 WAS-003-0003

Document Number: WAS-001-2270 To 2567 Parent: WAS-001-2005 Date: 03/01/89

Title: Draft Remedial Investigation Report Appendices - Volume II

Type: PLAN
Condition: DRAFT
Author: none: Camp Dresser & McKee (CDM)
Recipient: none: US EPA

Document Number: WAS-002-0001 To 0297 Parent: WAS-001-2005 Date: 03/01/89

Title: Draft Remedial Investigation Report Appendices - Volume III

Type: PLAN
Condition: DRAFT
Author: none: Camp Dresser & McKee (CDM)
Recipient: none: US EPA

Document Number: WAS-002-0298 To 0654 Parent: WAS-001-2005 Date: 03/01/89

Title: Draft Remedial Investigation Report Appendices - Volume IV

Type: PLAN
Condition: DRAFT
Author: none: Camp Dresser & McKee (CDM)
Recipient: none: US EPA

Document Number: WAS-002-1491 To 1538 Parent: WAS-002-0897 Date: 03/01/89

Title: Port Washington Summa Canister Final Report

Type: PLAN
Author: Mickunas, David B: Roy F Weston Inc
Recipient: Pritchett, Thomas H: US EPA

Document Number: WAS-002-1539 To 1751 Parent: WAS-002-0897 Date: 03/01/89

Title: Port Washington Summa Canister Report Appendix A

Type: DATA
Author: none: none
Recipient: none: none

Document Number: WAS-002-1752 To 1851 Parent: WAS-002-0897 Date: 03/01/89

Title: Port Washington Summa Canister Report Appendices B-D

Type: DATA
Author: none: none
Recipient: none: none

Document Number: WAS-003-0718 To 0718 Date: 03/14/89

Title: (Letter in response to 02/22/89 letter regarding the disposal of leachate contaminated groundwater)

Type: CORRESPONDENCE
Author: Vogt, Robert W: Port Washington Water Pollution Control District
Recipient: Als, Edward G: US EPA

Document Number: WAS-003-0714 To 0714 Date: 03/23/89

Title: (Letter confirming telephone conversation regarding an alternate remedial measure to be considered at L-4)

Type: CORRESPONDENCE
Author: VanDusen, Patricia: Southport Civic Association
Recipient: Als, Edward G: US EPA

Document Number: WAS-003-0717 To 0717 Date: 03/23/89

Title: (Form letter regarding public availability of the draft RI report for review and comment)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Als, Edward G: US EPA
Recipient: none: none.

Document Number: WAS-003-0713 To 0713 Date: 05/02/89

Title: (Letter forwarding "contract documents for Additions to the L-4 Sanitary Landfill Gas Control System" for review and comment)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Vrana, Robert J: North Hempstead NY, Town of
Recipient: Als, Edward G: US EPA

Document Number: WAS-003-0710 To 0710 Date: 05/12/89

Title: (Form letter announcing the 05/24/89 meeting of the Port Washington Landfill Superfund site citizens' advisory committee)

Type: CORRESPONDENCE
Author: none: US EPA
Recipient: none: Citizens' Advisory Committee

Document Number: WAS-003-0711 To 0712 Date: 05/12/89

Title: (Letter confirming agreement regarding information needed involving recent town initiatives at L-4)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: Delaney, John F: North Hempstead NY, Town of

Document Number: WAS-003-0708 To 0709 Date: 05/24/89

Title: (Letter in response to 05/02/89 letter pertaining to the contract documents for Additions to the L-4 Sanitary Landfill Gas Control System)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: Vrana, Robert J: North Hempstead NY, Town of

Document Number: WAS-002-1852 To 2106 Parent: WAS-001-2005 Date: 06/01/89

Title: Final Remedial Investigation Report Appendices - Volume V

Type: PLAN
Author: none: Camp Dresser & McKee (CDM)
Recipient: none: US EPA

Document Number: WAS-002-2107 To 2400 Parent: WAS-002-2109 Date: 06/01/89

Title: Draft Feasibility Study Report

Type: PLAN
Condition: DRAFT
Author: Bouvette, Tracy C: Camp Dresser & McKee (CDM)
Recipient: none: US EPA

Document Number: WAS-003-0001 To 0379 Parent: WAS-001-2005 Date: 06/01/89

Title: Final Remedial Investigation Report

Type: PLAN
Author: Bouvette, Tracy C: Camp Dresser & McKee (CDM)
Recipient: none: US EPA

Document Number: WAS-003-0705 To 0707 Date: 06/08/89

Title: (Letter in response to 05/12/89 letter pertaining to the proposed reconstruction of the blower house and compressors, and general details of the town initiative regarding L-4)

Type: CORRESPONDENCE
Author: Delaney, John F: North Hempstead NY, Town of
Recipient: Als, Edward G: US EPA

Document Number: WAS-003-0003 To 0003 Parent: WAS-001-2005 Date: 06/09/89

Title: (Letter submitting Final Remedial Investigation Report)

Type: CORRESPONDENCE
Author: Hyde, Robert A: Camp Dresser & McKee (CDM)
Recipient: Alvi, M Shaheer: US EPA

Document Number: WAS-002-2109 To 2109 Date: 06/20/89

Title: (Letter submitting Draft Feasibility Study Report)

Type: CORRESPONDENCE
Author: Hyde, Robert A: Camp Dresser & McKee (CDM)
Recipient: Alvi, M Shaheer: US EPA
Attached: WAS-002-2107

Document Number: WAS-003-0380 To 0693 Date: 06/27/89

Title: Endangerment Assessment

Type: PLAN
Author: none: Clement Associates
Recipient: none: Camp Dresser & McKee (CDM)

Document Number: WAS-003-0694 To 0704 Date: 07/01/89

Title: (Superfund Update announcing Proposed Remedial Action Plan - Port Washington Landfill Superfund Site)

Type: CORRESPONDENCE
Author: Als, Edward G: US EPA
Recipient: none: none

Document Number: WAS-003-1111 To 1221 Date: 08/09/89

Title: Minutes of the Public Hearing Held at the Carrie Weber Junior High School, Port Washington NY

Type: LEGAL DOCUMENT
Author: Ramos-Zayas, Cynthia: Court Reporter
Recipient: none: none

APPENDIX 4 - NYSDEC LETTER OF CONCURRENCE

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233-7010

Thomas C. Jorling
Commissioner

Mr. William J. Muszynski, P.E.
Acting Regional Administrator
Emergency and Remedial Response Division
U.S. Environmental Protection Agency
Region II
26 Federal Plaza
New York, NY 10278

SEP 28 1989

Dear Mr. Muszynski:

RE: Record of Decision (ROD)
Port Washington Landfill #130025

The New York State Department of Environmental Conservation (NYSDEC) has reviewed the draft Record of Decision, dated August 31, 1989, for the Port Washington site and concurs with the remedy as follows:

1. Closure of the L-4 landfill area in accordance with 6 NYCRR Part 360 Regulations for Solid Waste Management Facilities which include requirements for landfill slopes, cover materials, gas collection systems and gas/groundwater monitoring. These requirements limit the selection of gas source control to the perimeter gas collection systems outlined in the remedy.

2. Rehabilitation and extension of the existing active gas venting system to accommodate the entire perimeter of the L-4 area, including an additional combustion unit as standby, and rehabilitation of the existing active gas venting system.

3. Placement of extraction wells in the area of the upper glacial aquifer where elevated levels of groundwater contamination were found.

4. Treatment of extracted groundwater through metals removal and air stripping prior to discharge to a recharge basin or leaching pit.

5. Treatment of the Southport well through air stripping prior to discharge into the Port Washington water distribution system.

6. Installation of additional groundwater monitoring wells to aid placement of the proposed extraction wells. Additional groundwater and landfill gas wells around L-4 are to be used in conjunction with the existing landfill gas and groundwater monitoring network in order to comprehensively monitor L-4.

7. Development and conduct of a post-closure operation and maintenance plan which will govern those remedial actions selected in this ROD as well as those presently employed for the L-4 section.

8. This remedy will result in hazardous substances remaining on-site above health-based levels, so a review will be conducted no later than five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

In order for New York State to concur with the final ROD, the following provisions must be included in the document:

9. Air monitoring beyond the gas collection system is necessary. All passive vents used in the remediation process will also be subject to air regulations.

10. Any emissions resulting from air stripping of the groundwater are required to meet air quality standards, and emissions are to be monitored to determine compliance.

11. Additional groundwater and gas investigations will be conducted; including areas to the north and northwest of the site to further determine the extent of volatile organic and inorganic plumes. The RI did not fully determine the extent of contamination, and these investigations are needed to define extent of remediation.

12. The Southport well will not be used as the primary aquifer cleanup well.

13. Allowance for sampling of surface water and sediments in Hempstead Harbor and determining the fish and wildlife impacts should either the volatile organic and inorganic plume be found to be discharging into Hempstead Harbor.

14. The drum area known to be on-site will be addressed including identifying its contents, location relative to L-4, and extent of any release of contamination from the drums.

15. Modification of treatment alternatives is expected for additional on-site or off-site gas migration and volatile organic and inorganic plumes not yet detected.

Should you have any questions on these issues, please call Mr. Michael J. O'Toole, Jr., P.E., at 518-457-5861.

Sincerely,

Edward O. Sullivan
Deputy Commissioner

cc: W. McCabe
E. Als
D. Garbarini

APPENDIX 5 - RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY

PORT WASHINGTON LANDFILL
Port Washington, N.Y.

The U.S. Environmental Protection Agency (EPA) originally scheduled a public comment period from July 21, 1989 through August 21, 1989 for interested parties to comment on EPA's final Remedial Investigation/Feasibility Study (RI/FS) and Proposed Remedial Action Plan (PRAP) for the Port Washington site. However, due to the large volume of material contained in the RI/FS and PRAP, EPA honored requests to extend the comment period 30 days through September 20, 1989.

EPA held a public meeting on August 9, 1989 at the Carrie Weber Junior High School on Port Washington Boulevard, New York to describe the remedial alternatives and present EPA's proposed remedial action plan for cleaning up the Port Washington site.

Numerous questions were raised and addressed at the public meeting. A transcript of the meeting is part of the Administrative Record for the site and documents those questions addressed at the public meeting. Other comments received during the comment period, as well as those not addressed during the public meeting, are summarized and responded to in the responsiveness summary. All comments will be considered prior to the selection of the remedy for the Port Washington site.

The comments have been summarized and organized into two major categories: Proposed Plan and Remedial Investigation/Feasibility Study; and nine subcategories: Landfill Closure, Landfill Gas Control, Groundwater Remediation, Environmental Monitoring Program, and Operation and Maintenance; Remedial Investigation, Feasibility Study, Endangerment Assessment, and Miscellaneous.

COMMENTS ON PROPOSED PLAN

Landfill Closure

> Q: All plans for regrading or capping of the site must insure the maintenance of the haul road which serves as an air break and prevents additional gas migration toward the adjacent neighborhood. Odor control should also be a consideration when closing L-4.

A: This comment is noted and will be addressed during development of the closure plan.

Q: Storm water runoff from the L-4 site and from a significant drainage area, located west and northwest of L-4, ponds at a location along the western boundary of L-4.

A: EPA's preferred remedial alternative for source control (G-3) incorporates closure as one of the main elements. Because closure of the L-4 parcel must conform with 6 NYCRR Part 360 requirements, it must of necessity include capping of L-4 with a low density material, typically either compacted clay or a synthetic material. One of the purposes of such a cap is to minimize to the extent possible the amount of infiltration which can seep into the landfill through its cover. Therefore, given the fact that the landfill will be capped, seepage into the landfill under the scenario as suggested by the Port Washington Water District should be essentially eliminated.

With respect to stormwater runoff, the existing grading plan at L-4 results in ponding along the western boundary with resulting seepage into the landfill. To alleviate this condition, a grading plan will need to be developed, after the selection of a capping material, and included as part of the overall closure plan for L-4. One possible grading plan was included in the FS as Plate 1. It can be noted upon review of this plate that existing ponding conditions along the western boundary were taken into account. Stormwater runoff under a proper grading scenario will be directed from the

L-4 cap and to a properly sized retention pond. At present the size and location of such a pond has not been determined. Similarly, the point of discharge of the retention basin contents has not been finalized pending discussions with the various agencies involved in this decision-making process.

Q: In order to comply fully with NYSDEC regulations and the 33% design limitation, the L-4 property line must be extended outward by at least 110 feet beyond the Town's existing property line. This will require the taking of property from portions of the golf course, the Wakefield neighborhood, and possibly the Seaview property.

A: EPA understands from communications with the NYSDEC that a waiver to this provision may be available under 6 NYCRR Part 360 if certain criteria are met e.g., side slope stability, assurance of adequate drainage, etc.

The 33% side slope requirement will be further evaluate during development of the closure plan.

Q: The interior cap vents should be located away from the interior gas extraction wells to the extent possible, to minimize the potential for air intrusion into the extraction system.

A: This comment is apparently based on the selection of G-4 as part of source control (interior vents). The **SELECTED REMEDY** has recognized the need to develop an acceptable supplemental fuel source to assist in maintaining continuous combustion at the HCU. This supplemental fuel source may eventually be provided by utilizing interior landfill extraction wells as called for under the G-4 alternative. At that time, the location of the extraction wells could be selected such that air intrusion from passive capping vents would be minimal.

Q: The use of geosynthetics should be included for consideration as an alternative material for final capping.

A: This comment is noted and will be addressed during development of the closure plan.

Q: Passive vents should be installed in conjunction with the new cap for the L-4 landfill. These vents should be vented to ambient air, since improvements in the gas extraction system will result in reduced surficial emissions.

A: Passive vents are required under State closure regulations. A minimum of 1 vent per acre of cap is the specific requirement. Therefore, passive vents will be designed into the cap during the development of the closure plan. They will also be monitored after closure, at least initially, to insure that the emission levels of any hazardous gases will not pose a threat to public or worker safety.

Q: An extensive RI/FS was not required to conclude that a Part 360 cap is appropriate for the Landfill. L-4 should have been capped in 1985 at the latest.

A: EPA's involvement at this site between the time of site placement on the National Priorities List in 1983 and the development of EPA's workplan in 1985 was as enforcement support for the NYSDEC, and afterward as primary enforcement lead. A decision to close and cap L-4 during that period would have had to have been the result of a signed consent order with the Town of North Hempstead, which did not occur. In May, 1985, EPA began development of a workplan to investigate the site consistent with the National Contingency Plan through the use of CERCLA funds. Moreover, upon completion of the workplan in October, 1985, EPA offered the Town the opportunity to perform the RI/FS, which the Town declined to do.

One of the concerns raised during EPA's development of the workplan for this site was the effect capping might have on enhancing lateral gas migration from L-4. EPA considered this a valid concern, and therefore sought to evaluate it during the RI and FS process. EPA developed a final workplan for this site in October, 1985, but was unable to initiate fieldwork until December, 1986, because of the lack of funding appropriations while CERCLA was being reauthorized.

The chronology of EPA's involvement at this site made a remedial decision by EPA in 1985 on the capping issue impossible. Closure and capping could only have occurred at that time as the result of a signed order with the Town of North Hempstead and the regulatory agencies (EPA and NYSDEC).

Since 1985, the State of New York has amended its closure requirements (6 NYCRR Part 360, amended in 1988) to significantly upgrade the capping requirements for sanitary landfills. This action has played a significant part in EPA's decision to use State closure regulations as the applicable or relevant and appropriate requirement to close (and cap)
L-4.

Q: The specific design requirements for closure set forth in the FS are excessive. They are not always required by or consistent with State Part 360 regs. The ROD should only determine that a Part 360 closure plan should be developed in cooperation with and subject to the approval of NYSDEC.

A: It is EPA's intent to be consistent with the State Part 360 regulations in terms of closure for L-4. Moreover, EPA intends to develop the closure plan in cooperation with the NYSDEC, and to develop a plan that is mutually agreeable to NYSDEC (presently the support agency) and EPA (presently the lead agency).

Q: Flux box sampling was not warranted to determine whether or not a cap should be placed over L-4.

A: Flux box sampling provided useful data in EPA's attempt to quantify the emission rates of landfill gas from the top of L-4. The quantification of these emission rates was used predominantly in the Endangerment Assessment in air dispersion models to estimate the ambient air concentrations associated with the flux of chemicals from the L-4 surface. EPA agrees that the flux box sampling would be of limited use in determining whether a cap should be placed on L-4. EPA relied instead on its assessment of the design efficiency of the existing active venting system to make this determination.

Q: EPA must address surface water and erosion control in more detail.

A: This comment is noted and will be addressed in greater detail during development of the closure plan.

Landfill Gas Controls

Q: EPA has not allowed the Town to proceed with the gas control system extension which would control landfill gas which may be migrating into the Seaview Industrial Park area.

A: The extension of the gas control system should normally be implemented pursuant to an agreement under section 122 of CERCLA after a Record of Decision has been finalized for the site. Such an agreement would constitute authorization to the Town of North Hempstead as required in Section 122 (e) (6) of CERCLA, and would assure the Town and the Public that the Town will not be undertaking inconsistent response action. Obviously, under circumstances involving an immediate threat to public health or the environment and/or which may constitute an imminent and substantial endangerment to public health or welfare or the environment, EPA could either take a removal action or authorize/order the Town to take action to abate the circumstances posing threat or danger. The circumstance most obviously applicable in this case would be one in which an acute fire or explosion hazard existed.

The issue of subsurface gas migration in the Seaview Industrial Park area was the focus of a meeting held in December, 1988 among the EPA, NYSDEC, and the Town of North Hempstead. At the time, EPA had just finalized a report containing validated sampling results which indicated the presence of substantial amounts of methane in the northwest corner of the Industrial Park. It was agreed that the situation was potentially serious, and that a monitoring program should be commenced to analyze on a frequent basis for the presence of explosive gas within the potentially affected structures. NYSDEC personnel initially undertook this monitoring program, with the understanding that the

Town would eventually assume this role, with NYSDEC then providing oversight pursuant to their statutory authority.

The Town has verbally indicated to EPA that, based on the results of the NYSDEC's and the Town's sampling, no explosion hazard has existed within the subject buildings since the initiation of the monitoring program.

Q: The remedial measures explored and proposed for gas control are exclusively renovations and upgrading of the existing venting system employed by the Town. Do more effective or ideas exist i.e., slurry walls? Should the slurry wall be placed in refuse or native soil?

A: The suggested use of slurry walls would entail excavating an approximately 3 foot wide trench around the perimeter of landfill parcel L-4 from the ground surface to the water table. The wall would then be "keyed" into the water table so as to prevent landfill gas in the unsaturated zone from migrating vertically beneath the wall and escaping into the off-site environment. This wall would of necessity be installed in native material and not in the refuse. The refuse material likely contains many void spaces and it would be difficult to establish a continuous wall in such a media. Secondly, the native soil which is excavated is usually mixed with a bentonite clay and reintroduced to the trench as a soil/bentonite mixture. It is this mixture which then forms the slurry wall. Excavating refuse instead of native soil will require the importation of soil to make up this mixture. Thirdly, excavating a trench in refuse will likely cause caving of the trench walls, create odors, and leave an excavated refuse mass which needs to be disposed of. Clearly, there are advantages to the installation of a slurry wall in native soil as compared to the installation of such a wall in refuse.

After a review of current land surface elevations at the L-4 parcel to the elevation of the ground water table at the site, it is estimated that the wall would generally need to extend to depths ranging from approximately 25 to 35 feet along the eastern border of L-4 up to 130 feet at well locations LFG-202, TNH-4 and TNH-6.

Installation of a slurry wall to a depth of 130 feet raises concerns about the integrity of the wall and hence the reliability and effectiveness of such an installation. While vendors of such construction services claim to be able to install walls to such a depth, the difficulty of such an operation often leads to "windows" or holes in the finished wall due to sloughing of the sidewalls of the excavation. The presence of any windows clearly will negate the purpose of the wall and render it an ineffective means of subsurface landfill gas containment. It has been EPA's experience at one CERCLA site in EPA Region II where a slurry wall installed to a maximum depth of 40 feet for hydraulic containment experienced side wall sloughing with a resulting 100 fold decrease in the design permeability.

Another concern with using slurry walls to contain landfill gas migration in lieu of an active venting system is the difficulty posed in interpreting off-site landfill gas monitoring data and making adjustments to the remedial scheme. That is, with an active vent system as proposed in the FS, should the off-site monitoring wells show unacceptable levels of landfill gas the amount of gas flow at each active vent can be quickly measured, the presence of sediment or water covering a vent screen rapidly assessed, and the radius of influence of each vent tested in a timely manner to assure an overlap with each neighboring vent. In this manner the effectiveness of the active vent system can be readily analyzed, the specific area along the vent system where there are difficulties identified, and modifications and adjustments to the system operation quickly made. On the other hand, with only a slurry wall in place, a rapid correction in response to the presence of landfill gas off-site cannot be made. This data would only inform the operations staff that the slurry wall is "leaking", and would not indicate specifically where the leaks were occurring. To correct this situation would require that a new wall be installed in the area of the suspected "leak" and keyed into the existing wall. Certainly, the time to implement such a solution would be unfavorable when compared to the more rapid response time available when using an active venting system.

Therefore, EPA believes that extraction and control of landfill gas via a series of active vents as included in the source control alternatives described in the FS is a more effective and reliable means of controlling landfill gas migration. In addition, EPA believes that the design of the present active venting system is sufficient to protect public health, given the proper operation and maintenance (incl. continuous blower operation).

Q: EPA must include sealing of slabs in residences abutting the site as an immediate safeguard to be included as part of the proposed remediation measures.

A: EPA believes that the **SELECTED REMEDY**, which includes as part of its operation and maintenance provisions the continuous operation of the compressor station, will safeguard the residences abutting the site, not only from long-term health effects but also from acute threat of fire or explosion.

Q: Source control alternative G-3 does not adequately protect public health and the environment, since it (as well as alternatives G-1 and G-2) are continuations of past or current practices which have proven in the past to be ineffective in controlling gas migration. Any of these three source control alternatives will result in enhanced lateral migration after placement of a landfill cap. Therefore, G-4 should be selected, which includes gas extraction from the interior of L-4. These gas extraction wells should be placed on the eastern side of the fill. The use of propane supplemental fuel under G-3 may not be cost-effective.

A: EPA does not agree that the G-3 alternative is not adequately protective of public health and the environment. However, EPA recognizes that continuous operation of the HCU, if warranted, may require a supplemental fuel source. The only supplemental source of fuel under G-3 is commercial propane gas, which may not be cost-effective when compared to other supplemental fuel sources.

EPA recognizes that the provision for interior gas extraction wells under G-4 is a possible source of future supplemental fuel. Therefore, the **SELECTED REMEDY** addresses the potential utilization of interior gas extraction vents.

Q: It is questionable whether the existing system can be upgraded to insure a firm gas supply while maintaining gas pressures at a level low enough to prohibit or severely restrict offsite migration of gas from the landfill. There should be greater redundancy built into the expanded system.

A: It is estimated that the addition of 37 wells around the perimeter of the landfill will add 600 additional SCFM to the new blower station's loading. EPA generally estimates that an average of 4 blowers will operate under the **SELECTED REMEDY**.

To determine redundancy, the minimum reliability of the system needs to be determined. At other landfills where receptors were not as close, several days downtime would not be a problem; hence no redundancy would be required. Other times redundancy is looked at very closely and multiple blowers are installed accordingly. When redundancy is important but budgets are constrained, one blower may be installed as a back-up while a second or third blower may be available at the site for immediate installation. There is no industry standard for redundancy of blower operation.

Q: Additional options should be evaluated for disposal of landfill gas, including the following:

*cleansing and sale to LILCO as fuel
*cleansing and use for local generating capability, which power could then be sold to LILCO
*incineration in two HCU's, operated alternately.
*incineration in the proposed Resource Recovery incinerator
*cleansing and use as auxiliary fuel in the proposed Resource Recovery incinerator.

A: EPA has no objection to any of the various methods of landfill gas disposal outlined above, provided that they do not cause contravention of any applicable State/Federal laws or permit requirements, and does not create any significant health risks. The scope of the RI involved the assessment of the present method of landfill gas disposal. EPA's conclusion was that with continuous combustion no significant health risks would occur from this method of disposal.

Q: The complete perimeter gas collection and disposal system should be installed, activated, tested and made operational before capping begins.

Capping should progress in stages most beneficial to residents of the area and the interior cap vents should be installed, activated, and made operational before the next capping stage is begun.

A: A primary concern during the capping operation is continued control of landfill gas. During the leveling and closing operation at the landfill there may be a slight increase in resistance to gas flow in some areas on the landfill's surface.

To minimize the impact of the capping operation, the first step should be to upgrade the landfill gas system. This will consist of regrading the landfill along the path of the gas headers and installing the closure cap material at these locations. Once this grading is complete and the gas header has been reinstalled, the areas between the headers can be filled to complete the capping operation.

The rehabilitated gas headers may not be where they are currently located. It may be desirable to build new berms parallel to the existing header and then move the header. The construction of these berms should follow the New York State regulations. Grading for them should be done according to the closure grading plan.

Q: The following gas control measures should be evaluated:

*horizontal gas collection in a trench around the perimeter of the landfill.

*excavation of the solid waste landfilled against the natural cliff, incineration or disposal of the excavated materials in a properly permitted facility licensed to receive hazardous waste.

A: Horizontal wells can provide an excellent barrier to gas migration. The disadvantage of horizontal wells is the limitation on the depth that they can be installed and their cost.

The depth limitation on horizontal wells is based on the type of materials being dug and the level of the ground water. If the materials are sandy then it is likely that the walls of the trench would collapse. At this site the very steep side walls of the rock and gravel quarry indicate that the material is reasonably stable. The ability of the walls of an excavation to stand when excavating below the ground water is unknown, however. If caving occurred then extending the trench into groundwater would not be practical. Ideally the depth of the trench would extend below the historical ground water level.

One reason that vertical wells were selected over horizontal wells was the cost. It was felt that the installation of vertical wells would be less expensive than horizontal wells. Part of this is due to the cost of the excavation and part is due to the safety measures required to keep gas from escaping through the open cut.

When doing the final detailed engineering, if it is determined that the depth of the wells is 20 feet or less, horizontal trenches may be a preferred alternative over vertical wells. For the purpose of the preliminary design it was assumed that the vertical wells were 50 feet deep.

EPA believes that the excavation scenario envisioned by the commenter would not significantly increase protection of public health over a properly operated gas extraction system, and would be prohibitively expensive to implement.

Q: The recommendation to put presently disconnected active vents back into service should be reexamined. Putting these vents back into service will pull oxygen into the landfill, creating a fire hazard, while at the same time diluting the gas collected for HCU combustion.

A:In July of 1987, EPA performed testing at the Port Washington Landfill. The following results were obtained:

Well 124.....54% Methane
Well 125.....55% Methane
Well 126.....54% Methane
Well 127.....60% Methane
Well 128.....69% Methane

The gas extraction rate may be very low from these wells, hence more sophisticated control valves may be required to properly regulate the gas flows.

EPA agrees that placing too many wells into service without proper system balancing creates a risk of underground fires. In fact one well operating improperly creates a risk of underground fires. Balancing is an essential part of the gas system operation, which was previously stated in the FS.

Q: The removal of sediment from the active vents to improve gas extraction capability has been tried without success in the past, and therefore should not be included in the proposed plan.

A: Removing leachate/sediment from a landfill is a very slow process. Some success may be had by operating pumps continually over several years. However, a reevaluation of this aspect of system rehabilitation will be performed during design.

Q: The need for 37 new active vents to completely ring the perimeter of L-4 is unwarranted. Specifically, no venting is necessary to the north and east of L-4, since there is no development there. The gas extraction system should be extended along the southern perimeter of the landfill, however, in order to control gas migration towards the Seaview Industrial Park.

A: Both EPA and the NYSDEC believe that a perimeter venting system must be designed for in its entirety because of the proximity of potential receptors in the area. Gases that migrate in an initial direction that presently does not contain any development may eventually arrive under certain conditions at a receptor. Therefore, both agencies believe it is a prudent measure to design and implement a complete perimeter vent system to insure that methane from L-4 does not migrate offsite. However, this construction may be able to proceed in stages, based on areas of greatest need i.e., the southern perimeter.

Q: New extraction wells along the western perimeter of L-4 should be installed and tied into the active venting system.

A: The existing perimeter gas wells have shown that they are capable of controlling gas along the western perimeter. However, the installation of new perimeter gas vents may be acceptable in areas where it can be demonstrated that even with all available rehabilitation methods, certain vents cannot function as intended.

Q: The EPA recommendation to install a second HCU as standby does not serve any purpose, since any downtime associated with the first HCU is caused by insufficient BTU content in the collected landfill gas, and not because of any problems with the HCU.

A: EPA recognizes the abilities of the Town's HCU to perform efficiently, given an acceptable fuel source. EPA has addressed the supplemental fuel issue in the **SELECTED REMEDY.** Moreover, EPA believes that the addition of a second HCU as a standby unit is a prudent measure to avoid any downtime associated with future maintenance requirements, or catastrophic failures.

Q: The existing concrete cisterns should be destroyed as soon as possible to minimize further risks and nuisance to the public.

A: EPA agrees that if the concrete cisterns are not sealed or tied into the gas system they do pose a source of risk to nearby residents. The health risk assessment addressed these gases. Therefore, they will be either sealed or tied into the active vent system if it is determined that this is the most desirable way of maintaining combustion at the HCU.

Connecting the concrete cisterns to the gas system would require removing the rock from the top 20 feet of cistern, installing a PVC riser pipe and then backfilling the cistern with cement grout. The advantage of using the cisterns is that they collect gas from the very bottom of the landfill.

Q: Reconstruction of the gas header system will involve temporary removal of system components from service. This issue should be addressed so as to provide continuous protection from gas migration during construction of the new header.

A: This issue was addressed in the FS on pages 4-19 and 4-20.

Q: Are the replacement compressors adequate to meet the needs of the gas extraction system.

A: The adequacy of the new blowers will be determined during the design of the **SELECTED REMEDY**.

Q: All gas leaks in the header system should be repaired and condensate traps installed.

A: EPA agrees that this detail will be a focus of the rehabilitation of the active venting system.

Groundwater Remediation

Q: The proposed plan did not address odor problems associated with air stripping.

A: EPA did not believe that concerns about odors from the air stripping tower were warranted, based on the measured levels of chemicals in the groundwater. In other words, EPA felt that no odors would be able to be detected, given the amount of chemicals that would be removed from the groundwater and subsequently discharged. Conservative estimates of emission rates of these chemicals from an air stripping tower indicate that the odor most easily detected would occur from toluene, which will be emitted in concentrations approximately 20% less than the odor threshold value.

However, the issue of odors from the air stripping operation will be reevaluated again during the design stage of the project. If warranted, adjustments in the design stack height and/or air flow rates can be made to reduce odors.

Q: The plan must address adverse impacts from the dispersion of VOC's from the groundwater stripping tower, particularly to homeowners living in the Wakefield subdivision. How will the impacts be calculated. How will the emissions be measured, and how often.

A: The air stripper for the extraction wells will meet all substantive permitting requirements. During this process, steps are followed to identify the impacts of air emissions from the source. This process is known as the Ambient Air Quality Impact Screening Analysis and is contained in NYSDEC Air Guide 1. 5 steps, or "screens" are required prior to permit approval. Air treatment would be required depending on the results of this analysis.

The exact method and frequency of testing will be determined during the design/permitting stage of the project.

Q: What kind of pollution control devices could be added to the tower. What are their effectiveness and cost. EPA should not transfer contamination from one environmental media (groundwater) to the other (air).

A: There are several treatment technologies available for removal of VOC's from the air stream i.e., vapor phase carbon treatment, catalytic oxidation, and incineration. These treatment methods provide various removals of specific contaminants. Moreover, they are generally capable of total VOC removals greater than 90%. EPA will meet all ARARs for ambient air emissions from the proposed air stripping devices. Cost estimates at this phase of the project would be difficult to project: however, a very general estimate for the extraction well air stripping treatment would be $200,000/year.

Q: Will the extraction well implementation accelerate the movement of existing contamination, including a plume under L-5. Could the extraction wells induce salt water encroachment from Hempstead Harbor.

A: The extraction wells, by design, will only influence the shallow flow system i.e., Upper Glacial Aquifer in the immediate vicinity of the wells.

Q: EPA oversight and monitoring of leachate treatment or control is unclear. Replacement of the existing lagoon system is long overdue and the future effective treatment and control of leachate must be insured in the plan. A leachate balancing reservoir should be added to the new leachate system, if considered necessary.

A: EPA believes that the closure of the landfill in conformance with 6 NYCRR Part 360 will effectively address the problems identified in the RI concerning leachate control.

For example, capping of L-4 should gradually reduce the quantity of leachate available for potential release into the environment.

Details of leachate management involving L-4 closure will be identified in the closure plan to be developed by EPA and NYSDEC, or with EPA/NYSDEC oversight of potentially responsible parties.

Environmental Monitoring Program

Q: The proposed environmental monitoring plan is excessive in terms of frequency and testing parameters, locations of wells, and goes beyond State regulatory requirements. Specifically, there should be no LFG wells beyond the Town's landfill property line.

A: According to 6 NYCRR Part 360, the ARAR governing landfill closure, an adequate closure plan must be developed which contains in part an environmental monitoring program. This monitoring program must define "the nature and extent of current and potential release or migration of contaminants from the site" and "establish a long-term...well network...to protect public health and the environment". To this end, the conceptual long-term groundwater and landfill gas monitoring program as presented in the FS, was developed.

Specifically, groundwater and landfill gas monitoring well nests were located to the northwest, north, and northeast of L-4, in locations potentially impacted by organic concentration as indicated by the groundwater modeling exercise. Incidentally, the placement of LFG wells offsite is a continuation of the existing monitoring strategy for this landfill. These locations, coupled with wells constructed at the landfill border will provide valuable information associated with the extent of observed contamination which have or may migrate from the L-4 Landfill as required by Part 360. In addition, shallow monitoring wells are proposed between L-4 and neighboring public water supply wells which are closest to L-4 as a means of protecting public health.

Q: A deficiency of the proposed monitoring requirements is that no ambient air monitoring is recommended by EPA.

A: No ambient air monitoring requirements exist as part of the 6 NYCRR Part 360 regulations involving landfill closure. Previous ambient air monitoring has indicated that L-4 is not a significant source of elevated offsite ambient air levels of contaminants of concern. Therefore, monitoring during the RI (as well as any future monitoring) did not provide useful information to quantify low level risks from this exposure pathway. Instead, modelling efforts were employed to quantify the risk.

Any air monitoring requirements for the new passive vents created as part of the proposed capping of the landfill will be incorporated into the development of the monitoring aspects of the closure plan.

Q: It is inappropriate that post closure groundwater monitoring be used to complete an investigation that EPA failed to do i.e., delineate the plume of contamination. The groundwater monitoring program as proposed is excessive.

A: It was EPA's intent in the proposed plan to perform future groundwater and landfill gas monitoring for several reasons. Monitoring of releases from L-4 after closure was one reason. Groundwater monitoring to refine the positioning of extraction wells, as well as groundwater monitoring to the north to further define the hydrology and contaminant transport in this direction were other reasons for the proposed comprehensive monitoring plan. The part of the groundwater monitoring plan to further define the hydrlogy and contaminant transport to the north will most likely be part of a second operable unit RI/FS.

EPA does not believe that the conceptual groundwater monitoring plan which appeared in the FS is excessive; however, issues involving the number and placement of wells will be reexamined in greater detail during actual plan development.

Q: What factors will determine the location of proposed LFG monitoring wells near Salem Lane. Are there public health hazards associated with constructing these wells, or sampling them. Specify well sizing and depth. How long will they take to construct and what equipment is needed. Who is responsible for restoration of any damage caused by construction. How large an area is required for well access, and who is responsible for access maintenance. Could tampering with the wells create a danger to homeowners or to the environment.

A: A further review of existing information will first be made to determine the general areas that are desirable for obtaining information on groundwater or soil gas. Next, EPA will attempt to locate specific areas where it would be physically possible to place a well. Next, access arrangements would be discussed and arranged with the owner of the property, including any necessary rights of way. Finally, utility clearances would be performed in order to insure agreeable subsurface conditions. Usually, it is easier to secure access arrangements on public land.

Well sizing for groundwater monitoring wells is usually 4", while LFG wells are usually composed of teflon tubing one half inch or less. These details will be specified during design. Time to drill and depth of wells depend on subsurface conditions i.e., presence of incumbrances (boulders, etc.), depth to groundwater, etc. Again, the details will be developed during design.

EPA is ultimately responsible for restoration of damages incurred as a result of contractor's actions. However, damages are usually paid out of the contractor's contingency fund or through the contractor's insurance.

During well installation, a health and safety plan will be in effect which usually specifies that appropriate instrumentation be on hand to ascertain conditions once the hole is opened. The method of installation, or the level of worker protection required is contingent on these readings. Any tampering with equipment associated with these investigations should be brought to the attention of EPA so that an assessment can be made as to danger, repairs, etc.

Operation and Maintenance

Q: Routine inspections, downtimes, and maintenance activity should all be scheduled, in addition to the present method of conducting operation and maintenance on an as-needed basis.

A: EPA strongly agrees with this comment. These types of maintenance requirements should be incorporated into the development of the Operation and Maintenance plan for this remedial action, which will be developed during construction. EPA recommends also that this type of maintenance be employed in the interim for the existing facilities prior to the development of the additional O and M requirements.

EPA has determined that the only necessary operation requirement to be specified immediately is the continuous operation of the blower house, as described in the **SELECTED REMEDY.**

Q: Performance monitoring of active extraction wells, specifically for methane and oxygen content, should be included as part of routine operation and maintenance.

A: Performance monitoring has been recommended by EPA in the **SELECTED REMEDY.**

Q: EPA must make a firm commitment to continue maintenance and monitoring oversight during and after remediation due to the historical failure of the Town and the NYSDEC to provide adequate protection.

A: In lieu of PRP conduct of the remedial activities with State oversight, the State is statutorily responsible for the proper operation and maintenance at Superfund sites. However, EPA still is obliged under the law to perform post remedial monitoring of site conditions to insure that the remedial action is effective and working as intended. EPA plans to pursue this obligation aggressively at this site, since the remedy involves containment of hazardous wastes.

Miscellaneous

Q: EPA has not offered contingency plans for landfill capping, gas venting, groundwater stripping, and leachate removal.

A: EPA did not believe that contingency plans were necessary at the point of this remedy selection, although the **SELECTED REMEDY** does provide some flexibility in this regard. Moreover, EPA believes that the **SELECTED REMEDY** provides an implementable conceptual framework within which to make specific design decisions. If, for some reason, any part of this remedy is not implementable, administrative vehicles exist for the reformulation of that part of the remedy.

Q: Specific references have not been provided to identify other sites where remediation measures such as those proposed have been successfully implemented.

A: The industrial excess landfill in Uniontown, Ohio is similar with respect to landfill gas migration. Lees Lane Landfill is another example, located outside of Louisville, Kentucky on the Ohio River.

The use of air strippers to treat water for potable water distribution is presently planned at municipal supply wells in Vestal, N.Y. and Katonah, N.Y. There are numerous examples of Superfund sites in New York and nationwide at which groundwater extraction and air stripping treatment are being selected for implementation.

Q: Specific provisions must be included for continuing community involvement and acceptance of all phases of remediation including placement of wells and interpretation of test results. Also, dispute resolution procedures should be established.

A: The involvement of the affected community is a statutory requirement of CERCLA at Superfund sites. As such, a community relations planning and implementation effort must be involved which meets the approval of EPA. EPA will work with the community in the future to develop the community relations plan, as well as to continue the coordination with the affected community already established at this site.

Dispute resolution procedures are not necessary nor required at a Superfund site, since the federal government by law is the ultimate decision-maker.

Q: The plans of the Sierra Club involving the possible development of a regional park in the area of North Hempstead where the Port Washington Landfill is located should be incorporated into EPA's remediation plan for the L-4 section.

A: At the present time, EPA does not believe that the **SELECTED REMEDY** would adversely impact the plans outlined in the Sierra Club's proposal. However, EPA recognizes the need for coordination with the plans of the Sierra Club, and the accommodations of those plans where possible.

COMMENTS ON REMEDIAL INVESTIGATION/FEASIBILITY STUDY

Remedial Investigation

Q: Sufficient groundwater monitoring data was not collected in areas to the north and northwest of the L-4 landfill, and therefore the extent of groundwater contamination, both horizontally and vertically, is undefined.

A: EPA agrees with this comment, although EPA has already noted this observation in the RI, the FS, the Endangerment Assessment, and the Proposed Plan. The conceptual environmental monitoring plan contained in the FS and the Proposed Plan, and codified in this Record of Decision, is intended to, among other things, further define the extent of horizontal and vertical migration to the north of the site.

The workplan for the RI developed a groundwater investigation which was based on the widely held belief that groundwater flow in the study area was generally west to east. The RI has since determined that there is a localized bend of groundwater generally to the north in the vicinity of L-4. As a result, only two EPA wells (EPA wells 103 and 104) were properly situated to give any information on groundwater flow directly downgradient of L-4.

The determination of the extent of this northerly flow, and any associated contaminant transport is one of the goals of the environmental monitoring program contained in the **SELECTED REMEDY**.

Q: The conceptual model suggested in the RI to account for groundwater contaminated with low level VOC's west of L-4 i.e., landfill gas (with VOC residuals) solubilization in water from precipitation events percolating down to the water table, is incorrect, and the EPA analysis upon which it is based contains mathematical errors. The model, and in general the entire design of the RI, allowed EPA to reach the result it wanted to reach (without supporting data) i.e., that L-4 is the source of groundwater contamination to the west.

A: Based upon a review of historical data, as well as data collected during the RI, EPA believes landfill gas has historically migrated off-site not only to the west of L-4, beneath the Country Club and Wakefield Drive, but to the southeast of L-4 in the vicinity of Seaview Industrial Park. These occurrences are documented by various investigators mapping areas of elevated methane gas. EPA also observed methane gas migration west of L-4 during a period of time when the active landfill gas extraction system was not operational. Therefore, before the active extraction system was operated, landfill gas migrated at elevated levels off-site, and when the active extraction system does not operate, landfill gas has a tendency to migrate in elevated concentrations west of L-4.

The flux box samples collected by EPA on the surface of L-4 provides evidence that L-4 contains elevated levels of Vinyl Chloride,1,1 Dichloroethene, trans 1,2 Dichloroethene, 1,1 Dichloroethane, 1,1,1 Trichloroethane, Benzene, 1,2 Dichloroethane, Tetrachloroethene, Chlorobenzene, and Trichloroethene. In addition, these constituents have been detected historically in the leachate as determined by Nassau County Department of Health and Town consultants. These hazardous constituents have and continue to reside within the L-4 cell.

EPA also determined through their field investigations that the landfill gas extraction system was in a state of disrepair, where portions of the system failed to operate reliably.

Based on these observations, excursions of volatile organic contaminants along with methane gas off-site where not uncommon historically (i.e. before the landfill gas extraction system was installed) or recently (given the system's existing state of disrepair). Therefore, volatile organic constituents have been and continue to migrate off-site from L-4 at elevated concentrations.

One of the concerns associated with any gaseous volatile organic constituent migrating off-site is its impact on the shallow groundwater flow system water quality. The groundwater quality data collected historically, and recently, indicate that all of the volatile organic constituents found within L-4 (evidenced by leachate and flux box samples) are found in the shallow groundwater adjacent to the site, with few exceptions. Using the data collected by EPA, albeit data representing a period when landfill gas extraction was actively operating, landfill gas concentrations were correlated to groundwater concentrations for selected coupled well nests and compared to Henry's law constants as a mean of evaluating the potential for rainfall percolate or gas condensate to "load" the groundwater flow system with volatile organic contaminants. In other words, air-to-water partitioning was evaluated to determine if the vapor contamination which was known to migrate off-site could contaminate the groundwater flow field.

The results of this analysis (which have been revised based on comments received) indicate that select volatile organic contaminants (i.e. 1,1,1 Trichloroethane at EPA 104, and 1,1 Dichloroethane at EPA 202) could have partitioned from the landfill gas into the groundwater simply based on observed concentration gradients. Again, this was at a time when landfill gas extraction was occurring, presumably lessening the observed concentration of vapor phase contamination.

It is important to note that pertinent components of the present character of contamination west of the L-4 are that:

- the natural groundwater hydraulic gradient does not allow for the migration of contamination from L-4 to the west under conditions without Southport pumpage; and

- the contaminants found west of L-4 recently are exclusively volatile organic contaminants (with the exception of some above background observances for chloride, chromium, lead, and copper at EPA 104).

The migration of vapor phase organic contaminants through the unsaturated zone hydraulically upgradient of L-4, followed by solubilization via gas condensate or rainfall percolation, with a resultant contaminant loading of the groundwater is a viable contaminant transport mechanism which agrees with observed phenomenon and implicates the L-4 cell as a source of groundwater contamination.

Although data has not been collected which specifically identifies the source of contamination which led to the decision to close the Southport well in 1981, the above defined contaminant transport mechanism could have potentially impacted the groundwater contained within the well's zone-of capture, especially since the Southport well contamination occurred during a period of time when the active venting system was not yet constructed and presumably elevated levels of organic constituents were free to move away from L-4 to the west through the unsaturated zone.

There were significant reasons for EPA to test this particular conceptual model. First, the mechanism had been proposed previously by other researchers. Second, L-4 was an obvious possible source of the type of contamination found in the groundwater, since similar chemicals had already been measured in gases coming from L-4. Third, inorganic as well as VOC groundwater contamination had been measured between the Southport Well and L-4 in 1981, followed by the dissipation of the inorganic contamination but the persistence of the VOC contamination after the closure of the Southport Well (1981), suggesting that L-4 leachate was not the source of the contamination to the west of L-4. Therefore, the conceptual model described above was developed and tested as a possible contaminant pathway.

EPA sought to evaluate during the RI other source scenarios as well, which involved placement of wells upgradient of the Southport Well (EPA wells 107 and 111) to establish whether there existed possible upgradient sources; the review of the sewer district collection system in the area between Port Washington Boulevard and L-4; and speculation about difficult-to-trace dumping episodes to the west of L-4.

Q: There is no fourth round of landfill gas data in the RI.

A: The results of the abbreviated fourth round of landfill gas sampling (4 LFG wells were sampled at various depths-all these wells were in the Wakefield sub-division) can be found in the back of RI Appendix Volume V.

Q: The Southport Well was never sampled during the RI. The RI thus failed to confirm whether the Southport Well is now actually contaminated. EPA's reliance on Southport Well data from 1981 is absurd. In addition, EPA never attempted to find out whether the Well had actually ever been contaminated.

A: The Southport Well was sampled three times during the RI; however, the results were reported in the RI report under the Well's Water District designation-N4223. EPA regrets any confusion thereby created.

The results of the first two sampling rounds did not detect any contamination; however, the third round utilized analytical procedures that produced lower detection limits, and the following compounds, with concentrations in parentheses, were reported: trichloroethylene (.6 ppb), benzene (.1 ppb estimated), total xylene (.5 ppb estimated), and chlorobenzene (.3 ppb estimated).

The reason that EPA has proposed treatment of the Southport Well is not based on the above sampling results for the Well. The Southport Well is located in a very localized area of relatively clean water. Rather, it is based on the sampling results obtained for all wells within the Well's theoretical zone of contribution, and the conservative estimation of what the water quality at the Well would be after its return to service and subsequent continuous pumping over time. EPA estimates that, based on the above approach, the Southport Well within a matter of weeks would begin to experience a degradation in its water quality as contamination from within the zone of contribution (and primarily downgradient of the Well) makes its way to the Well.

EPA believes that this approach is not only reasonable but necessary to determine the need for treatment at the Southport Well.

EPA performed an evaluation of this site in 1981 using the Hazard Ranking System, which is used to determine whether a candidate site merits placement on the NPL. Data from 1981 was used at that time because it was current. The resulting rank of this site was high enough for placement on the NPL, due in large measure to the contamination at the Southport Well. The ranking process is subject to quality assurance checks prior to actual placement of the site on the NPL.

Q: The memo from Nassau County Department of Health alleging that 10-20 million gallons of leachate from L-4 containing volatile organic contaminants was discharged to the ground between 1974 and 1977 is mere speculation, and this discharge never occurred. EPA made no attempt to locate any real evidence in this regard. Moreover, the RI omits mention of the discharge of leachate into the ground from the actions of EPA contractors (puncture of the leachate line). This is an example of EPA's biased approach.

A: EPA considers the Nassau County Department of Health's memo as a convincing indication of historical problems with L-4's leachate control between the years 1974-1977.

A description of the puncture of the leachate line was not in the RI for several reasons. First, it occurred as EPA was drilling its easternmost groundwater monitoring well (EPA 101). This well is approx. one mile hydraulically downgradient from the Southport Well, and is therefore well outside the Well's zone of contribution. Second, the leachate spillage (estimated at 30,000 gallons) was already pretreated to remove volatile organic compounds via mechanical aeration. Third, neither the monitoring well which was subsequently installed nor any other well in that area (Town wells 7,8,11, and 12) showed contamination during the RI with volatile organics from the spill.

Q: The RI does not document the direction of groundwater flow (northward), nor the threat to the Lloyd and Port Washington Aquifers. The model results which indicate that contaminant transport to the north of L-4 includes a downward component are speculative, not supported by data, and directly contrary to significant studies conducted by others i.e., that the area in question is not a deep recharge zone.

A: The localized northward component of groundwater flow was a conclusion of this RI/FS. It is based on two sets of groundwater level measurements taken during the RI to develop a piezometric surface in the vicinity of L-4. These water level measurements are included in chapter 4 of the RI report, while the piezometric surfaces (both hand drawn and computer generated) are included in chapter 5. The potential threat to the Lloyd and Port Washington Aquifers has been based on these water level measurements, as well as the water level measurements which indicate that recharge of groundwater is occurring in the vicinity of L-4. These measurements are referred to as observed vertical gradients at well pairs and can also be found in chapter 5 of the RI report.

The potential threat to downgradient aquifers chiefly depends on the extent of this northerly component of groundwater flow. Therefore, EPA has included additional groundwater monitoring to the north as part of the **SELECTED REMEDY.**

The other aspects of the **SELECTED REMEDY** which involve management of groundwater contaminant migration are generally independent of this further characterization of the northerly component of groundwater flow.

Q: The RI only included interpretation of geology and hydrology, but did not give information on the source of these interpretations.

A: EPA collected over 700 readings for wells in the Port Washington Water District alone, as well as interpreted numerous area public and private water supply and observation well boring and geographical logs (including nearly 100 drillers logs for wells on Manhasset Neck). In addition, EPA interpreted hydraulic testing data, including over 100 specific capacity tests of area water wells; analysis of several pump tests performed at various locations (especially at the Southport and Stonytown wells); collection of historical pumpage records (including a total of 44 wells from the Port Washigton Water District, Sands Point Water District, Roslyn Water District, and Plandome Water District).

Q: Stratigraphic interpretations made by EPA are apparently inconsistent with previous mappings. Was Perlmutter's criteria (1949) used to define the stratigraphy in the area?

A: The hydrogeologic evaluations in the RI were made using various tools to identify hydraulic properties of the juxtaposed formations. As such, differentiation between the Magothy and the Upper Glacial, or the Port Washington Confining Unit and the Raritan Clay was performed based chiefly on hydraulic response and resistance to flow. At the Stonytown Well, for instance, the RI indicates that the Raritan Clay exists above the Lloyd Sand. This means that a significant continuous aquitard such as the Raritan Clay exists above a continuous sandaquifer, such as the Lloyd Sand, at the Well. Whether the sand sediments which comprise these formations are pleistocene or cretaceous is generally immaterial. As such, washing collected cores on sieves and subsequent microscopic examination in order to evaluate the sediments against Perlmutter's criteria was not warranted, as long as the hydraulic properties of the soils in question could be characterized. Of greatest importance in a Superfund groundwater investigation is the water carrying characteristics of the stratigraphic units, in order to
determine contaminant migration pathways and remedial pumping alternative evaluations.

The inconsistency of this hydraulic approach with previous investigators for purposes of mapping stratigraphic units may be explained as follows:

- EPA had more data with which to characterize the area beneath and in the immediate vicinity of the Landfill;

- the characterization of the stratigraphy at the site involved use of vigorous hydraulic analyses not attempted by previous investigations; and

- the naming convention used by previous investigators may not be entirely consistent with hydraulic property segregation techniques employed by EPA.

It must be stressed, however, that the appropriateness and accuracy of the stratigraphic mappings presented by EPA are consistent with the historical data, and the recently collected site specific hydrogeologic databases, within the context that the mappings are based chiefly on differentiation of the stratigraphic units by hydraulic characteristics.

Q: The RI should have included additional geohydrological data from the area, as well as a larger base map than the one provided, fence diagrams etc.

A: EPA believes that the information provided in the RI serves to adequately support the FS analysis and consequently the **SELECTED REMEDY** identified in this Record of Decision.

Q: Maps should be made to show the hydrological effects of the simultaneous pumping of major wells in the area.

A: Some of the effects of various pumping scenarios were outlined in the FS, chapter 3 (see figure 3-21).

Q: The groundwater model is not verified.

A: The ability of the groundwater model to reproduce both the static and transient groundwater flow system (including responding to pumpage at the Stonytown well) lends credence to its use in evaluating not only contaminant transport migration pathways in the soluble phase, but also to identify zones-of-capture for water supply wells located near the site under various pumping conditions.

Since the extent of both the inorganic and organic contaminant plumes are not mapped in their entirety as a result of the RI field investigations, the groundwater model provides valuable insight into their probable direction, and rates of migration.

Feasibility Study

Q: The conclusion that all remedial alternatives must immediately begin with the immediate reactivation of the Southport Well is inexplicable. Since reactivation of the Well (without treatment) would result in increased risk to public health, why reactivate the well. Also, there are no ARARs or policies that compel the reactivation of this Well.

A: The reactivation of the Southport Well without treatment was only included in the no action alternative, which serves as a baseline for risk assessment purposes. The reactivation of the Well without treatment was considered part of the no action baseline since EPA had defined the remedial action objectives in chapter 2 of the FS as: the protection of human health and the environment by controlling the sources of contamination at the site, eliminating the potential exposure pathways, and restoring lost resources. The restoration of lost resources (Southport Well) was a remedial action objective since the Southport Well contamination was a major reason why EPA originally took response action at this site (see previous discussion on Hazard Ranking System).

EPA believes that the two management of migration alternatives evaluated in detail in the FS (W-2 and W-3), which both involve the reactivation of the Southport Well to service with treatment, are both fully protective of human health.

Q: Reactivation of the Southport Well, which is presently outside any contaminant plume, will spread the contamination through the aquifer. Thus, reactivation of the Well cannot be compelled by any desire to improve groundwater quality in the Upper Glacial Aquifer.

A: The commenter is referring to management of migration alternative W-2, which both the FS and analysis of alternatives in EPA's Proposed Plan indicated would have the undesirable effect of "smearing" contamination in the Upper Glacial Aquifer between the Well and L-4. This effect would be much smaller under alternative W-3 because the addition of extraction wells under this alternative would create a hydraulic barrier to reduce this smearing effect. However, there would be incidental removals of contaminated groundwater and partial aquifer cleanup under alternative W-2, the Well would be returned to service with treatment and be fully protective of human health, and there would be significantly less cost involved than as a result of implementation of alternative W-3.

After analysis, both EPA and NYSDEC rejected the W-2 alternative, and chose W-3 as part of the Proposed Plan distributed in July, 1989.

Q: The FS confuses the Southport Well with the Upper Glacial Aquifer as the natural resource that is irreplaceable. Once conventional groundwater remediation is performed to abate the aquifer conditions west of L-4, the Well can then be reactivated without extensive and unnecessary pretreatment.

A: The use of extraction wells (conventional groundwater remediation) to improve aquifer conditions within the zone of contribution to the Well to the degree necessary for reactivation of the Well without treatment generally takes a long time. EPA did not believe that this would represent achievement of the remedial response objective i.e., restoration of a lost resource (Southport Well).

EPA also considers the restoration of the locally degraded Upper Glacial Aquifer as a remedial response objective. However, the nature of this restoration is markedly different than restoration of a community potable water supply well from the perspective of time. The restoration of an aquifer cannot proceed quickly; rather, some methods of aquifer restoration may be better or faster than others, but they are all measured in years.

Q: Reactivation of the Southport Well would require a concommitant reduction of withdrawal rates elsewhere in the Water District because of State imposed water caps, and therefore it is unnecessary to reactivate the well.

A: EPA did not consider the overall water balance of the Port Washington Water District in its development of remedial action objectives. Moreover, EPA has discussed the reactivation of the Southport Well as part of remedial action since February, 1989 at several EPA/CAC/Town meetings, and has never been informed that the Water District no longer wanted/could no longer use the Well. In fact, EPA sought to explore several institutional constraints earlier this year which could affect certain elements of a possible remedy, among them the Water District's acceptance of an air stripper at the Southport Well.

EPA has now been informed (as part of the District's comments on the Proposed Plan) that the Water District believes it is premature to return the Well to service. Therefore, EPA will provide a treatment facility at the Southport Well at some future date eventually selected by the Water District, given a re-demonstration of need for such treatment at that time.

Q: The FS improperly screened out the no action alternative for groundwater contaminant migration.

A: The FS did not screen out any aspect of the no action alternative, but rather carried this alternative over to the detailed evaluation phase as required in the NCP. The alternatives evaluation in the Proposed Plan only included those alternatives that survived screening, and the no action alternative was included in that analysis (and rejected).

Applicable or Relevant and Appropriate Requirements (ARARs) i.e., MCL's for volatile organics, are presently being contravened in the Upper Glacial Aquifer in the vicinity of L-4. This was sufficient reason to reject the no action alternative for management of migration during the detailed evaluation of alternatives.

Q: Proper coordination of the extraction system and the reactivation of the Southport Well should result in the ability to use the Southport Well without treatment.

A: EPA does not believe this is true, at least not in the foreseeable future. While it is true that the treatment facility required at the Southport Well would be much smaller under W-3 (the commenter's scenario) than it would be under W-2 (no extraction wells), nevertheless EPA believes that MCL's would still be eventually contravened at the Southport Well if reactivated with no treatment. See the analysis in the FS section 4.3.1.

Q: The FS indicates that 60 drums were excavated in 1987 from a small area between L-4 and L-5, but no mention is made of the fact that the Town did extensive testing which failed to demonstrate any environmental harm from that area. This is an example of EPA's biased approach.

A: EPA believed that the appropriate place to provide details on the drum issue was in section 5.4 of the RI, with the analytical results that were obtained located in Appendix Q. EPA realizes that the extensive nature of the RI, FS, Endangerment Assessment and attendant appendices was not an easy review task. This was the reason why EPA granted a thirty day extension (to sixty days) for review of and comment on the various reports. EPA regrets any misunderstandings or confusion resulting from the sheer bulk of the study. .

Endangerment Assessment

Q: The Endangerment Assessment says that landfill gas enters area homes through cracks between the walls and the floor. The gas actually is pulled into the homes through the opening in the foundation located in the heating rooms.

A: The evaluation of soil gas infiltration into homes in the Wakefield subdivision assumed that infiltration occurred along cracks between the walls and foundation of the home. This is a well known transport route for soil gas infiltration into the home. Some homes in the Wakefield area have gravel filled openings in the foundation around the furnace. The gravel filled openings in the foundation provide a route of transport similar to the cracks evaluated in the Endangerment Assessment. A recalculation of the upper bound maximum risk involved with this pathway using the larger furnace slab opening indicates an overall increase in risk associated with this pathway, which is still within EPA's range of acceptable risk.

EPA's selection of remedial action calculated to further reduce the levels of offsite gaseous VOCs is an important consideration when examining these baseline (no action) risk numbers.

Q: Although EPA's conservative approach is not generally objectionable, at times it is misplaced, particularly when it is applied when site conditions are known. The future residential use scenario is not plausible.

A: The residential use scenario evaluated for the L-4 landfill assumed that a person lived on the L-4 landfill for 9 and 30 years in the average and plausible maximum cases, respectively (not for 70 consecutive years). These factors are listed in the EPA's Exposure Factor Handbook and are recommended for use as the average and reasonable upper bound of residence time in a single home.

While residential use of a former landfill is not highly likely, there are instances where this has occurred in the U.S. in the past. The purpose of a baseline endangerment assessment is to evaluate potential risks under the no-action alternative (i.e., in the absence of remedial actions including institutional controls). As was stated in the Endangerment Assessment, residential use was evaluated to provide an upper bound on potential exposures and risks associated with future landfill use and to enable remedial actions, including institutional controls, to be identified if necessary to preclude such future use.

Q: Methane gas is excluded from a detailed examination in the Endangerment Assessment. It is EPA's public role and responsibility to refrain from ignoring the obvious hazards due to methane gas.

A: Methane is not toxic, therefore no toxicological health effects would be expected from potential exposures to this gas. The primary potential hazards from this gas are from explosions and asphyxiation. Explosions in the form of furnace "puff-backs" occurred in homes near the landfill during the winters of 1979, 80 and 81 (Remedial Investigation Report, CDM 1989). The Town of North

Hempstead subsequently undertook remedial measures in the form of passive and active venting systems to reduce the migration of methane from the landfill and concentrations of methane in homes to below the lower explosive limits. No explosions are known to have occurred since this time; moreover, the possible migration of methane has been since monitored on a regular basis, and will continue to be monitored as a condition of landfill closure. Since the hazards associated with methane are much more easily detected and are presently being monitored, it was not considered necessary to provide an analysis of the potential hazard associated with methane. In addition, because the methane gas concentrations required for asphyxiation are approximately five times greater than the upper explosive limit for methane, there is no potential for asphyxiation due to methane gas in the homes near the landfill.

Q: EPA relied on desk top calculations in place of direct field measurements of landfill gas. EPA should have performed in-house air monitoring within Wakefield Avenue homes, as well as taken samples from the outlet side of the HCU.

A: EPA utilized desk top calculations to extrapolate field data in order to predict what exposures would occur at receptors where direct field measurement would either: not be able to detect the low order of chemical exposure; or not be able to discern the low order of chemical exposure from background levels. This is common practice at many Superfund sites when dealing with low level chemical exposures.

In the Endangerment Assessment, field monitoring data was used with fate and transport models to determine exposure levels. In determining indoor air levels inside the Wakefield homes, soil gas measurements from the Wakefield area were used with transport and dispersion models that are commonly used in risk assessments. While long-term measurements of indoor air would provide additional information, the usefulness of it would be questionable since it would be difficult to determine the contribution of the landfill to any measured concentrations in the house. This is because several of the principal chemicals of concern migrating from the landfill are common constituents of household products such paints and cleaning products. In such cases the use of models is a standard and valid approach to predicting concentrations from a particular source.

The HCU stack sampling analysis conducted by Velzy Associates was used to determine the destruction/removal efficiency (DRE) of the HCU for the organic chemicals of potential concern for this source. The DRE values from the Velzy report were used to reduce the stack emissions to reflect the operation of the HCU.

Miscellaneous

Q: How will the implementation of the plan be paid for. What are the specific costs for remediation of the Southport Well.

A: If EPA pursues the implementation of the **SELECTED REMEDY** in the absence of a negotiated settlement with potentially responsible parties (PRPs), then half the funding for this action will be provided through Congressional appropriations mandated under CERCLA. The other half will be provided by the State of New York. EPA would then seek to recover the federal government's expenditures from the PRPs at a later date.

If there is a negotiated settlement with PRPs, then the cost will be borne by the PRPs, utilizing whatever funding sources are at their disposal. EPA could also use its legal authorities to require the PRPs to implement the selected remedy.

Specific cost information for the management of migration portion of the **SELECTED REMEDY** is included in Table 6 of this Record of Decision.

Q: EPA must expand the boundaries of the L-4 Superfund site to include the L-5 portion of the Town of North Hempstead's landfill. The entire Port Washington landfill area should be addressed in EPA's Proposed Plan and RI/FS. The inclusion of the L-5 site to the Superfund list is essential.

A: The L-5 portion of the Port Washington Landfill is being operated by the Town of North Hempstead. The Town's operations, which are currently restricted to fields 1 and 2, are being overseen by the NYSDEC under the terms of a 1983 Stipulation Agreement between the Town and NYSDEC. According to NYSDEC there are some problems with respect to landfill gas migrating from L-5. DEC is working with the Town to correct these problems and expects to incorporate the corrective action measures into a permit for field 3, which is needed by the Town for landfill expansion. For example, the Town recently installed a slurry wall between fields 2 and 3 in an attempt to control the gas migration problem.

The L-5 portion of the Port Washington Landfill is under the jurisdiction of NYSDEC and, in accordance with the aforementioned permit discussions for field 3, is being managed appropriately by NYSDEC. Therefore, EPA does not anticipate taking an active role in the operation and subsequent closure of L-5. In addition, there is no evidence of an "imminent health hazard" to area residents which would qualify the L-5 site for "emergency" action under EPA's removal program.

EPA has not conducted any investigations with respect to L-5, since it is under the jurisdiction of DEC. According to DEC there is a landfill gas migration problem, but they are working with the Town to correct it through a permit for field 3.

Since L-5 is an active sanitary landfill with a double liner beneath it and a slurry wall between fields 2 and 3, there is no reason to believe it is a source of contamination at L-4. In addition, since DEC is committed to resolving the current gas migration problems with the Town, EPA has no justification to usurp the State's authority in this matter. Should future problems arise or current problems be exacerbated, EPA would attempt to utilize one of the aforementioned mechanisms to qualify the site for remediation under Superfund.

EPA and DEC believe that the proposed remediation for L-4 will be effective without including L-5, since L-4 will be capped in accordance with New York State law, the gas collection system will be improved and groundwater will be remediated.

Once L-5 has reached its capacity, it too will be capped in accordance with State law. This action is independent of any similar measures undertaken at L-4. Should problems arise (or continue) with respect to gas migration or groundwater contamination due to L-5, EPA anticipates that NYSDEC will use its authorities to require remediation of the problem.

L-5 has a double liner to prevent groundwater contamination and a slurry wall between fields 2 and 3 to control gas migration; therefore, EPA believes that L-5 will have no appreciable effects on L-4. Should problems arise (or continue) with gas migration or groundwater contamination due to L-5, the proposed remediation systems at L-4 could be expended to accommodate the increased capacity. Such expansions would only be eligible for funding under the Superfund program if the L-5 site qualified for remediation, as noted previously.